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CHEMICAL PROCESSING.

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CUTTING TEST-TUBE-TO-TANKCAR TIME

... page 45

Chemical materials introduced during past 18 months . . . in easy-to-use listing . . . page 50

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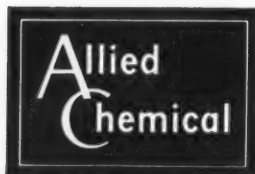
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**conventions
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August 11-13. Western Packaging & Materials Handling Exposition, Civic Auditorium, San Francisco.

August 19-22. Western Electronic Show and Convention, Pan Pacific Auditorium, Los Angeles.

September 4-5. International Conference on Air Pollution, American Society of Mechanical Engineers, Hotel Statler, New York.

September 7-12. American Chemical Society, National Meeting, Chicago.

September 9. Synthetic Organic Chemical Manufacturers Assn., luncheon meeting, Hotel Roosevelt, New York.

September 9-12. Tenth National Chemical Exposition, International Amphitheatre, Chicago.

September 15-19. Instrument Society of America, Annual Instrument-Automation Conference and Exhibit, Pennsylvania Convention Hall, Philadelphia.

September 21-24. American Institute of Chemical Engineers, Regional Meeting, Hotel Utah, Salt Lake City.

September 28-October 2. Electrochemical Society, Fall Meeting, Chateau Laurier, Ottawa, Ontario, Canada.

September 29-October 1. Second Conference on Analytical Chemistry in Nuclear Reactor Technology, Civic Auditorium, Gatlinburg, Tennessee.

September 29-October 3. American Society of Tool Engineers, Semi-annual Meeting and Western Tool Show, Shrine Exposition Hall, Los Angeles.

October 3-12. American Industrial Exposition of Electronics, Automation and Atomics, sponsored by In-

... Meetings and shows of interest to the chemical industries

Intercontinental Trade Shows of Los Angeles, Hamburg, Germany.

October 5-8. Federation of Paint and Varnish Production Clubs, 36th Annual Meeting, and the 23rd Paint Industries' Show, Cleveland Public Auditorium, Cleveland.

October 5-8. National Association of Corrosion Engineers, Northeast Regional Meeting, Somerset Hotel, Boston.

October 8. Synthetic Organic Chemical Manufacturers Association, luncheon meeting, Hotel Roosevelt, New York.

October 14-16. Society of Industrial Packaging and Materials Handling Engineers, 1958 National Industrial Packaging, Handling and Shipping Exposition, Coliseum, Chicago.

October 15-17. National Association of Corrosion Engineers, North Central Regional Meeting, Cincinnati.

October 20-22. American Oil Chemists' Society, Fall Meeting, Sherman Hotel, Chicago.

October 20-24. National Association of Corrosion Engineers, South Central Regional Meeting, Roosevelt Hotel, New Orleans.

October 20-24. National Safety Congress and Exposition, Conrad Hilton, Chicago.

October 21. American Society of Safety Engineers, Annual Meeting, Conrad Hilton Hotel, Chicago.

October 22-24. American Vacuum Society, Inc., Fifth National Vacuum Symposium, Sir Francis Drake Hotel, San Francisco.

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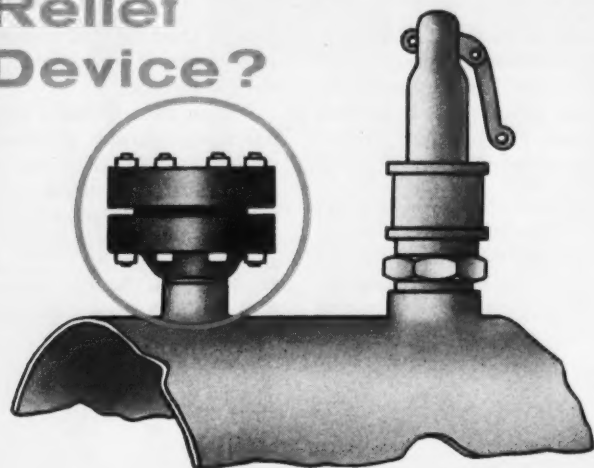


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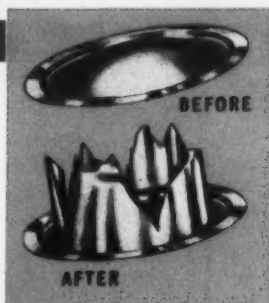
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Vol. 21

August 1958

No. 8

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CHEMICAL PROCESSING



over the editor's
shoulder



'Test tube to tank car' problems

Since today's major problem is "the current squeeze on profits" and "how do we reduce costs?", CP editors approached one phase of this problem which requires some analysis. This relates to the length of time it takes to bring a chemical from the laboratory to the commercial stage. Since this is a major problem, CHEMICAL PROCESSING editors called together a group of key men to discuss this problem. Representatives of the manufacturing chemical industry and those of the user side were represented. These users came from the broad spectrum of the chemical processing field.

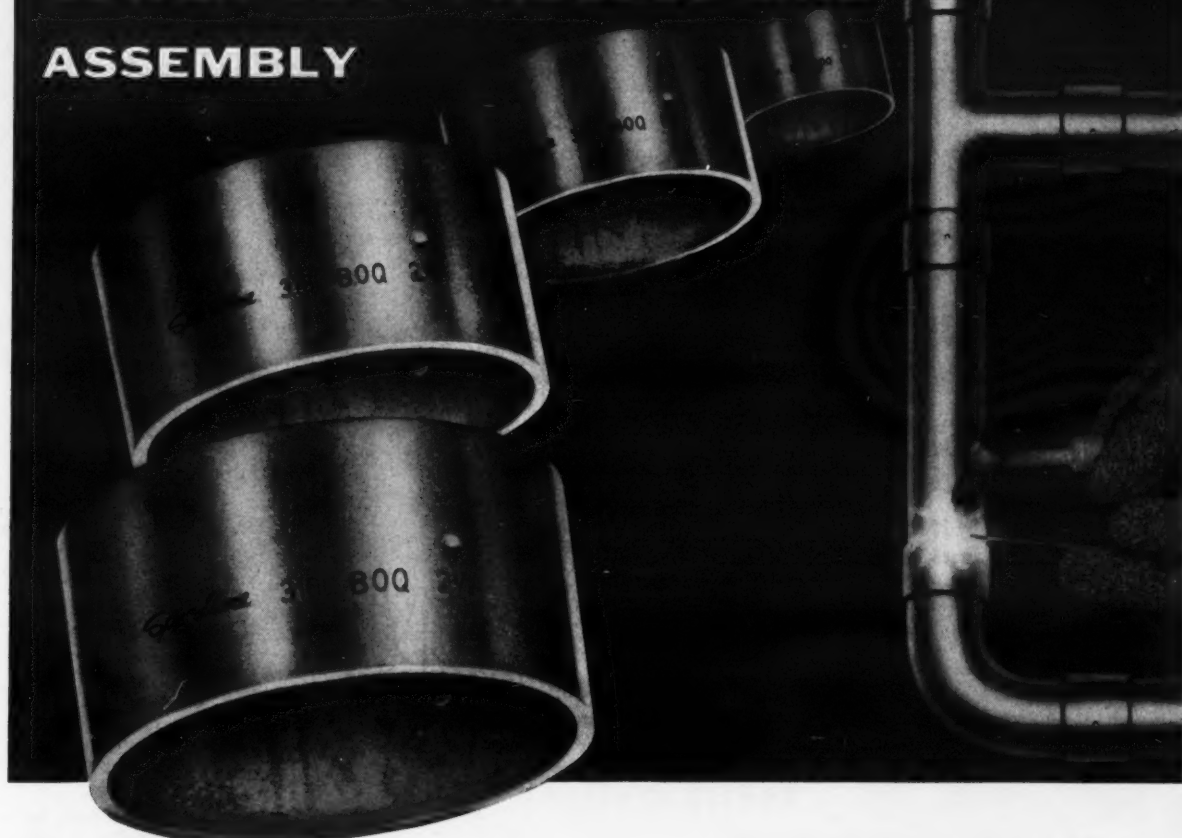
In a four-hour discussion, ideas were exchanged as to how "a chemical company could shorten the time from test tube to tank car."

Space availability will not permit us to publish all of the 25,000 words taken in their transcript. We would like to have published the entire story. This has been "boiled" to the 4,000 word story starting on page 45.

If you're interested in ideas to help you shorten the time from "test tube to tank car" we suggest that you read the "meat" contained in the story.

John C. Vaaler
Editor

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highlights



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VOLUME 21 • NUMBER 8

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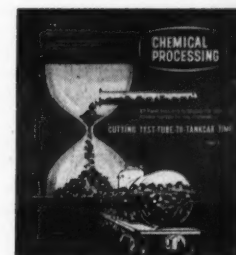
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THIS MONTH'S COVER

Our cover symbolizes the time lag — often tremendous — in bringing a new chemical from test tube to tankcar. A CP panel report (page 45) evaluates techniques for shortening the span. Also — starting on page 50 — is an easy-to-use listing of chemical materials introduced during last 18 months.



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Education in Holland

Dear Sir:

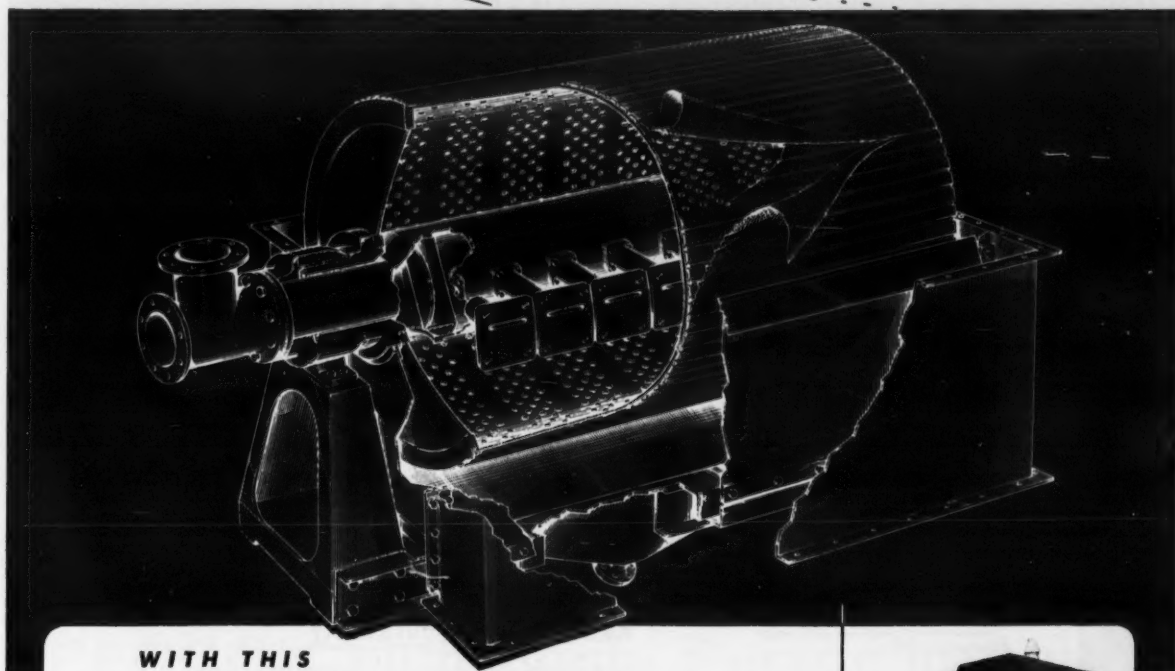
Your article "Where Have We Failed in Education" (May, page 20) makes me think of my own education in the former Netherlands East Indies as well as in the Netherlands, where from the first grade in the elementary school on the children were taught a sense of duty prior to their rights. Every year only a certain group of them (that passed tests) went to the next grade, so that finally in the highest grades only the "brains" remained. There was a certain competitive spirit among these kids.

My two children have been enrolled in California elementary schools now for over a year and I feel that they are taught with a very different attitude. There is no competitive spirit and I have the impression that they are taught more about rights than duties, and with this I do not want to disdain any of the fine things that are done and good methods employed to make the children grasp the things better and easier.

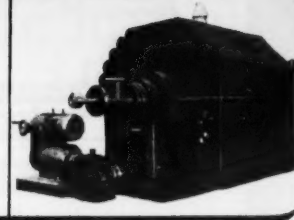
What about the Dutch children that did not have the brains or absorption capacities to pass the tests? They had to stay in the same grade another time and most of them thereafter passed the examinations (at least in the elementary schools) and went forward only somewhat slower, or perhaps were put in special schools.

Before entering the high school, a selective test was made and those who did not pass could enroll in one of the many industrial schools, or else try to pass tests for a school probably equivalent to the junior high school.

Talking about the Dutch high school in comparison to the American high school, I understand that pupils here can select their own studies. Not so in Holland and in most west-European countries. There is a certain program starting out from about 14 different studies and ending with about 18, giving the junior plenty to do at home in the



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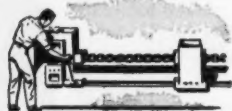
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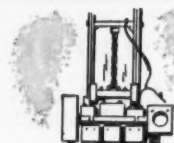
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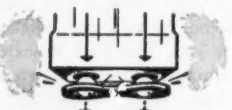
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LETTERS

evenings. All these courses have to be followed.

It does not do any person any harm to work hard and it is most probably the cure to many "diseases" of the teenager. I was not surprised when told that juvenile crime, addiction, etc., in this country are far worse than in countries like Holland, Belgium, Germany, and Sweden, because of the difference in the number of leisure hours and the indifference with regard to reaching a certain goal where the competitive spirit is missing.

I know that many industries in Europe have learned much from America and I hope that America will try to gather and use the information about the European education systems which have proved to be good in several ways.

B. J. TROMP

Temple City, Calif.

School change needs impetus

Dear Sir:

It seems to me that most present comments on education are directed at the symptoms rather than at the disease. I believe that every country has the type of educational system that the majority of its people want, considering both their needs and economic status. The present approach of fussing with the educators, who represent the will of the voters, cannot result in a fundamental change.

The objectives of an educational system are based on what the people *think* they need. Correctly or incorrectly, our people see themselves as secure from all danger in the closest earthly approach to the Best Of All Possible Worlds. Having shut out the rest of the world as unpleasant, we want to concentrate on "getting along," undisturbed by the innovator, the intellectual and the iconoclast. We like things the way they are, and want them to go on that way.

The only way to revitalize education that I can see is to

LETTERS

need better education. When the need for education is apparent, any community will alter its scale of values, demand a suitable system, pay all its costs, and honor the outstanding products of the program, for it will need these products for its own benefit.

In my opinion, therefore, the force necessary to revitalize our educational system must come from outside our community. Further, this force must be in the form of an outstanding opportunity or an immediate danger. There is some question whether any opportunity would provide a sufficient need as we have so much material wealth already. Thus the force probably must come in the form of danger.

Many qualified people feel this danger already exists. If so, then proponents of a better educational system could profitably devote their efforts to clarifying the danger and presenting this in a form that the general public could understand, in competition with the product commercials that constantly lull people from major problems by occupying their minds with small decisions. If this message can be properly conveyed in the limited time available, we can change our educational system. I doubt if any important change can be obtained in any other way.

CARL PACIFICO

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In the meantime, you will find the following bulletins of interest—they're free at your request:

BULLETIN No. 4 — Peracetic Acid 40%

BULLETIN No. 69 — Epoxidation and Hydroxylation with Becco Hydrogen Peroxide and Peracetic Acid.

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"One thing about it —
they were smarter than
we gave them credit for."

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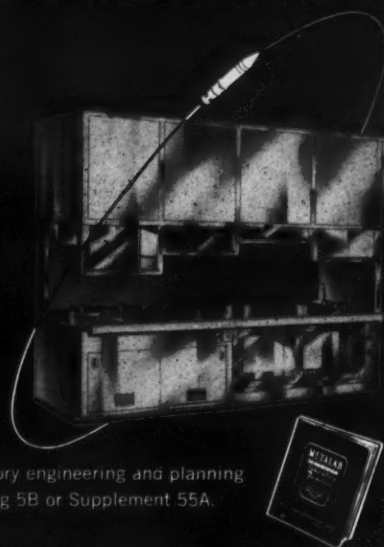
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Watching Washington

New Wage Floors For The CPI?

If recent decisions on drugs and paints are any barometer, the chemical process industries can look forward to a 20 to 50 cents per hour increase in minimum wages under the Walsh-Healey Public Contracts Act.

Preliminary steps are now under way to redetermine wage floors in chemical plants. Walsh-Healey sets minimum hourly rates for employees working for firms holding government contracts in excess of \$10,000. It authorizes the Secretary of Labor to issue minimum wage determinations for industries under contract on the basis of the typical plant's minimum wage.

Currently under this act, wage minimums in industrial and refined basic chemicals stand at \$1.15 in the North and \$1.00 in the South. Organized labor is looking for a hike — and two years ago a start was made at a re-determination, but it never got past the first step. This time it looks as if something final will come out of the time-consuming wage survey and hearings procedures.

One thing almost certain with the new wage rates — the minimums will be the same in all areas of the country.

While the new rate will cover only those companies doing business with the government, chances are that it will have an effect on other companies as well. But unless the minimum takes a fantastic jump, large companies won't have to do much readjusting.

Further along the way toward final redetermination are wage minimums in the drug and pharmaceuticals industry and the paint and varnish industry. What happened in these two cases may be significant in predicting the outcome in chemicals.

Drug industry minimum wages will be upped from \$1.00 to \$1.20 an hour with American Pharmaceutical Manufacturers Association agreement and labor settling for less than its suggested \$1.38 an hour. (The average U.S. drug industry wage is about \$2.10.)

Not quite so content are the paint and varnish makers. They asked for a \$1.05 minimum in the South and Southwest and \$1.25 minimum for the rest of the country. Labor asked for \$1.60-\$1.66 industry-wide. A substantial boost from the existing \$1.00-\$1.05. On the basis of evidence presented and an analysis of government procurements, competition was characterized as being substantial and in no way localized. The minimum was set at \$1.50 industry-wide. (Here the average U.S. wage is about \$2.20.)

The National Paint, Varnish and Lacquer Association is not holding still for this. Objections have been filed requesting the Southern differential. The trade group holds that the wage survey used for purposes of the determination does not justify the Southern rate as proposed. No objection was registered on the \$1.50 figure for the rest of the country.

On the basis of Labor Department statistics, the 50 percent increase in the minimum rates under Walsh-Healey could mean an overhaul in the wage structure for a large percentage of the paint industry, particularly if the Southern figure stands at \$1.50.

Over the objections of industry groups, final determinations for the scientific, industrial and laboratory instruments industry have been set at \$1.20 an hour minimum. An industry panel called this "inflationary" and said that it would give foreign producers a competitive advantage in the domestic market.

The Labor Department is also scrutinizing the soap and

detergent, textile, and paper and pulp industries. Preliminary steps are also under way toward a first determination in the tire and tube industry.

As the Labor Department goes about redetermining wage scales, Congress is taking a look at the Walsh-Healey Act itself and how it's being administered. This is probably based on industry complaints that the act is outmoded.

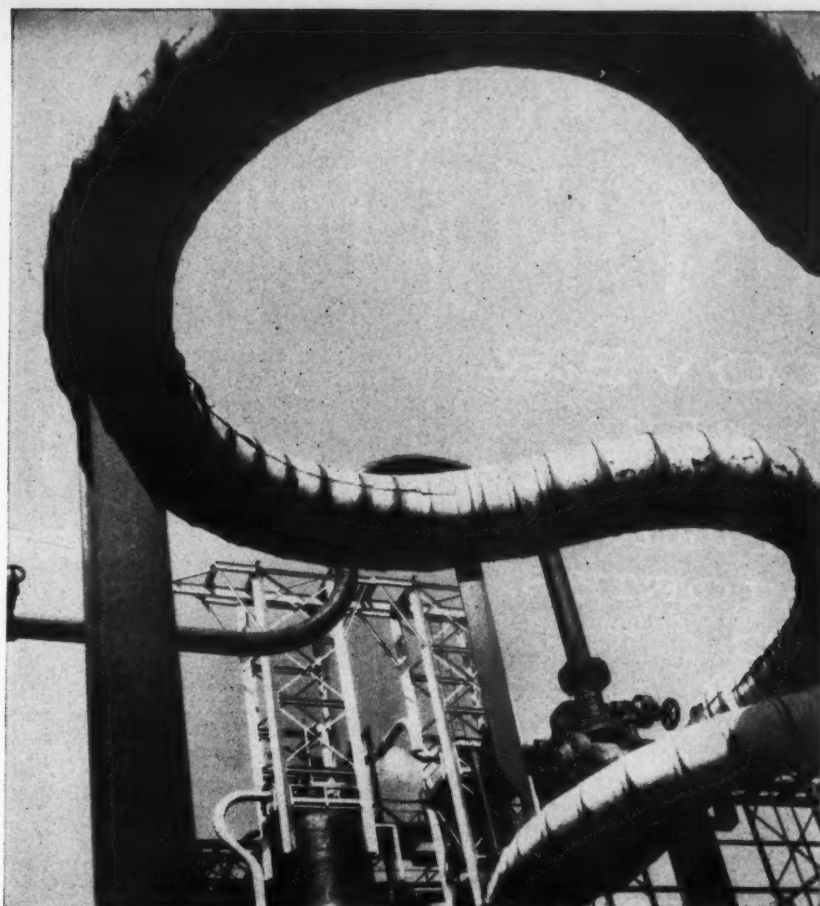
The danger of too large an increase in rates — which should be of concern to all chemical processors and to the government as well — is establishment of artificial minimums which could not be supported in times of economic distress.

Interesting sidelight on all this: While the government on the one hand is busying itself with antitrust suits to give the little guy a chance, increased minimum wages under Walsh-Healey will make it easier for big companies to get government contracts — at the expense of the smaller, local company who can't match the minimum wage requirements.

Why all the antitrust indictments?

In recent months the chemical process industries have been hit hip and thigh by a series of antitrust violation indictments. Du Pont; Carbide; the polio vaccine manufacturers; then 29 oil companies, always favorite targets for antitrust prosecution; and most recently, Chas. Pfizer for monopoly on citric acid, and several dyestuffs manufacturers. And drug and pharmaceutical companies will soon come under the gun again in connection with ethical drug pricing.

A substantial clue to the reasons behind the sudden activity is given in the personal attitude of Victor R. Hansen, latter-day "trust buster" and head of the Department of



Kraft paper pulping operations have their own odor characteristics. Even their "sour cabbage" smell has been effectively controlled with Airkem.



Airkem installations are simple to operate and low in cost. No change is required in process or plant construction.

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Kraft pulp industry odor problems are also complex. However, Airkem odor control chemists and field engineers have found the solution to this

problem as well. In the United States and other parts of the world Airkem odor counteractants have removed the stigma of obnoxious odors from kraft pulp mills without requiring changes in process or plant design.

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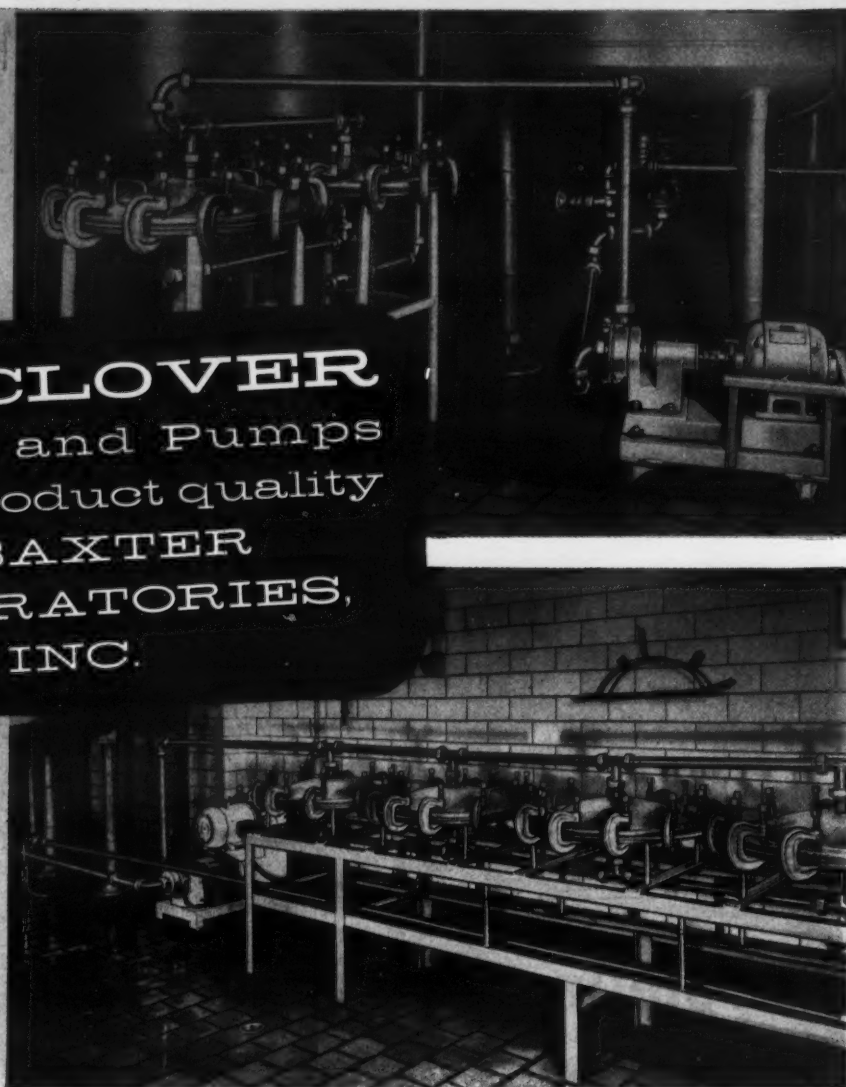
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View showing some of the Tri-Clover fittings and one of the transfer pumps being used in the main processing room at Baxter Laboratories.

TRI-CLOVER

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For at Baxter Laboratories, as in other important processing operations, users have found that there is no substitute for the high quality and complete sanitation inherent in Tri-Clover products.

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WASHINGTON NEWS

Justice antitrust division.

The chemical process industries are the major private investor in research. According to Hansen, companies are now using research as a commercial weapon and one of the main areas of antitrust violations exists in the field of research. This includes, and we quote Mr. Hansen, "patent abuses, divisions of fields among companies, monopoly in the manufacture and sale of products."

Hansen is also on record as saying that companies engage in research only in areas which would give them a particular commercial advantage.

Without commenting on the merits of any specific antitrust action, it is interesting and significant to note that recently Hansen used, as an example of practices tending to restrict research, those employed by RCA, General Electric, Westinghouse and AT&T. These firms, are, of course among the leaders in research investment.

The antitrust division, concerned for a period of time with alleged violations tending to impede technological competition in the electrical and electronics industries, has now trained its sights on the chemical process industries.

As long as Hansen is convinced that the legal device of antitrust law will help stimulate competition and account for progress in the field of basic and applied research, chemical process companies can look forward to hearing more from the Justice Department. They should be prepared to discuss and explain why they research where they do, why they don't conduct certain types of research, and how their licensing agreements bear on their research activity.

It appears that Hansen believes there is restriction in research and he is prepared to lift the industry up by its heels if he feels it's necessary.

As if unaware that chemical process companies compete daily with the successful products of research he observes, "With the continued growth of technological competition there may come a

CHEMICAL PROCESSING

corresponding tendency on the part of certain elements in industry to circumscribe this type of competition through illegal restraints . . . we shall continue to devote our enforcement energies toward restraints affecting industrial research."

The law of the marketplace and the concept of building a better mousetrap appear to have little or no significance in the eyes of the Department of Justice.

Nuclear fuel producer receives safety award

In recognition of its excellent safety record in operating 352,000 man hours without a disabling injury, the Nuclear Fuel division of Olin Mathieson Chemical Corporation was presented an award by the AEC. The division manufactures components for nuclear reactor cores.

AEC grants first license to decontaminate, store

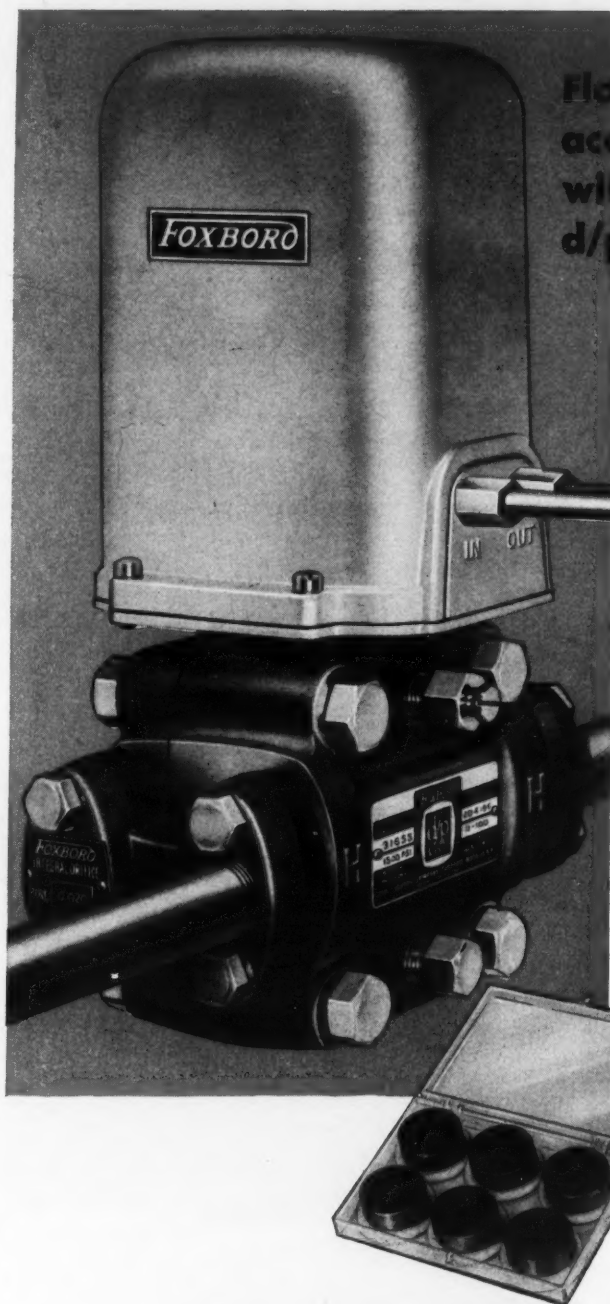
Tracerlab Inc., has been issued the first license granted by the AEC covering decontamination operations and storage of waste by-product materials accumulated as a result of any decontamination operation.

The license, which covers all three primary Tracerlab locations in Richmond, Calif., Waltham, Mass., and Houston, Texas, is the only one of its kind issued to date. Provisions of the license cover decontamination operations in all 48 states and D.C.

NEXT MONTH

Lewis Harris and Dr. Clifford Furnas air both sides of the controversy on the tax-exempt Research Institutes. Are they tax-favored competition? Or are they indispensable cogs in the machinery of scientific progress?

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The Foxboro Type 13A Integral Orifice Transmitter gives you, not only new high accuracy in measurement, but also accurate remote indicating and recording. Write for complete details. The Foxboro Company, 818 Neponset Ave., Foxboro, Mass., U.S.A.
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Case histories of successful solutions to instrumentation problems found in process and plant will be only part of the September Instrument highlight.

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a team of process design engineers, plant and instrument engineers answer the question of how to make the best use of latest theory and equipment . . . as quickly as possible.

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For more information on product at left, specify 6452 see information request blank opposite last page.





recent books

reviews of current technical and reference work . . . summarized for you by authorities in the field with the CP staff

Chemistry of Carbon Compounds Vol IV-A

Reviewed by
D. S. DAVIS

Head, Department of Pulp and Paper Technology
University of Alabama

Volume IV-A of "Chemistry of Carbon Compounds," edited by E. H. Rodd, is devoted to heterocyclics. T. S. Stevens contributes three chapters: Compounds with Three- or Four-membered Heterocyclic Rings, Compounds Containing a Five-membered Ring with One Hetero Atom (Nitrogen), and Compounds Containing a Five-membered Ring with One Hetero Atom (Oxygen or Sulfur).

J. D. Loudon gives us two chapters: Compounds Containing a Five-membered Ring with Two Hetero Atoms, (Pyrazole and Iminazole Groups), and Compounds Containing a Five-membered Ring with Two Hetero Atoms (Dioxole and Oxazole Groups and Their Thio Analogs). We owe Compounds Containing a Five-membered Ring with More Than Two Hetero Atoms to E. Hoggarth, and Compounds Containing a Six-membered Ring with One Hetero Atom (Nitrogen) to N. Campbell.

As with previous volumes of this series, all material is thoroughly documented. Structural formulas are copiously used, and the many tables are employed effectively. A 92-page subject index follows 714 pages of text and 26 pages of front matter. Coverage of the forthcoming Volumes IV-B and IV-C is announced.

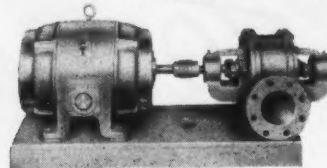
To obtain "Chemistry of Carbon Compounds — Vol IV-A" remit \$28 direct to D. Van Nostrand Co., Inc., 250 Fourth Ave., New York 10, N.Y.

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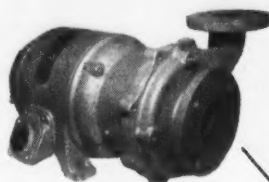


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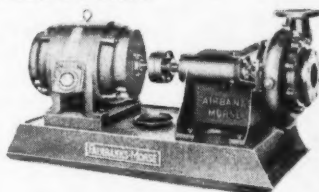
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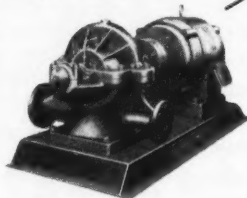
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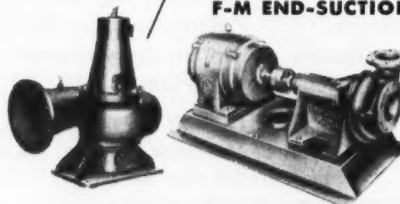
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RECENT BOOKS

Materials Handling Applications

"The uninitiated frequently question, sometimes critically, why a professional engineer takes days, weeks, or even months to determine the methods and the equipment to be used in a given materials handling situation. Such an attitude misses the salient point that it is not a matter of finding a solution, but rather of finding the best possible solution to the problem," states the author in the preface of this 381-page guide to material handling operations.

And that is just what author D. Oliphant Haynes does as he goes about reviewing the many factors in this complex study and spelling out the necessary steps essential in evaluating possible methods and equipment in order to arrive at a sound economic solution to a particular problem.

Starting logically with the problem, author Haynes takes the reader through such subjects as types of materials to be handled and equipment with which to handle them to final chapters on how to make the final decisions. Chemical processing engineers will find sections on handling special sizes and shapes and handling bulk materials particularly interesting.

To obtain "Materials Handling Applications" remit \$12.50 to Chilton Company, Book Division, 56th and Chestnut Sts., Philadelphia 39, Pa.

Check 6456 opposite last page.

Inorganic Syntheses Volume 5

Reviewed by
DANIEL MEYER
Blacksburg, Virginia

This volume of 265 pages, fifth in a proposed series of at least six, is a compilation of methods of synthesizing some sixty inorganic compounds and numerous related or analogous substances. These methods have been devised and contributed by men prominent in the field of in-

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CHEMICAL PROCESSING

dustrial process development as well as in academic and research circles. In no sense is this a cookbook for technicians. Text is addressed to those who understand the language of inorganic, organic, and physical chemistry, and are familiar with basic and classical methods of chemical synthesis.

Chiefly because of the diversity of subject matter, the format of the book is rather complex. The explanation that "... the syntheses in Volume 5 are arranged by chapters on the basis of the Mendeleev periodic classification" is not very enlightening until this arrangement has been given considerable study.

Arrangement of the index may confuse those who do not read the prefatory page of fine print or do not have access to all five volumes. The subject matter of the previous four volumes is included in the index of Volume 5, and each entry is numerically coded as to volume and page.

Chemical equations involved in the various steps of a synthesis usually introduce the chapter or section devoted to that particular synthesis. Then follow an introductory statement, procedure, properties of finished product, and expected yield.

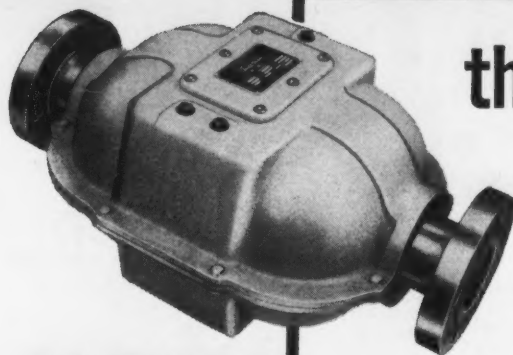
Some of the more complex and more difficult syntheses are discussed at length. Each has been critically evaluated by one or more checkers, who have added their comments and suggestions as footnotes.

Each section of the thirteen chapters is well-annotated by specific reference to pertinent chemical literature; evaluations and criticisms of the checkers are usually supported by quoted statements of other workers in the field.

Book, edited by Therald Moeller, is not meant for easy reading, but it does make a valuable addition to the library of the research and development chemist.

To obtain "Inorganic Synthesis, Volume 5" remit \$6 direct to McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y.

To page 19



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Foxboro's first Magnetic Flow Meter went "on stream" in 1954. Today, this new-type meter has gained industry-wide application for precise, continuous measurement of difficult process liquids.

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sodium chloride brine
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**MAGNETIC
FLOW
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“Why are so many PROTECTIVE features engineered into the new H-25 PAYLOADER?”

This question is frequently asked of Ralph Beyerstedt, Executive Vice President of The Frank G. Hough Co. because of his more than twenty years of experience in charge of engineering.

“During the development of the H-25,” Mr. Beyerstedt explained, “as soon as it became evident that we were going to obtain the increased capacity, production, ease of operation, speed and mobility we sought, our engineers then gave major attention to protective features for operational insurance against wear, maintenance, abuse, downtime and the like.

“The more than 10,000 small HA “PAYLOADER” tractor-shovels that we have produced for steel mills, foundries and chemical and fertilizer plants operate under conditions which continuously subject the machines to dust, dirt, powder and foreign materials.

“Because these are sources of major headaches for owners and operators,” said Mr. Beyerstedt, “we have given extra special consideration to elimination of the problems they cause.

Dozens of Protective Features

“Starting with the *triple* air cleaning system (1) we have a precleaner and dual oil-bath air cleaners for engine intake, and crankcase breather tube (17).

“Next, each of the three oil systems is equipped with a cartridge-type oil filter (2). These take care of the engine oil, the hydraulic-system oil and the power-shift transmission and torque converter oil.

“The self-adjusting, hydraulic service brakes (3) are *sealed* and the parking brake is enclosed in the transmission and operates in oil for greater dependability.

“The reservoir (4) of the closed, pressure-controlled hydraulic system has built-in cartridge-type filter and *sealed* dip-stick.”

In discussing the components of the electrical system, Mr. Beyerstedt said, “There is a 12-volt system with the battery grounded direct to the starter housing; a non-vented, *sealed* generator (5); *sealed* ignition distributor (6); shock-mounted instrument panel (7) with solder-coated terminals and a plastic-coated wiring harness (8); *sealed* circuit breaker together with *sealed* ignition and starter switches (9) plus clutch-pressure warning device (18).

“*Sealed* teflon bushings are used extensively throughout with brake and transmission disconnect mechanism (10) and valve control mechanism (11).

“These *sealed* ball joints (12) are used with gearshift linkage and *sealed* ball joints of a different size (13) are used with the accelerator linkage.

"The steering linkage uses *sealed* ball joints on the tie rods (14), and on the drag link (19). The steering bell crank (15) is *sealed*, also the spindle and kingpin assemblies.

"The boom arm mechanism has tapered roller bearings and dust covers on the bell cranks (16) and *sealed* mated bronze and steel bushings plus O-ring seals at all major pivot points."

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The carry capacity of the H-25 "PAYLOADER" is 2,500 lbs.—25% greater than has ever before been available in a tractor-shovel of its size and maneuverability, yet it easily loads and unloads box cars with narrow 6-foot doors. It is the only loader in its size range with *complete* power shift transmission—having 2 speed ranges forward and 2 in reverse. Power-steer is also standard so that operating speed and

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Polyamide Resins

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Dr. Floyd has worked with Versamids, General Mills' polyamide resins, and has authored about 20 articles on this subject.

His book covers uses in coatings and films, fibers, molding and casting, extrusions, adhesives, water dispersions, organosols, and inks.

The digest-size book is one of a continuing series on the plastics industry, and contains many tables and photographic illustrations.

To obtain "Polyamide Resins" remit \$4.50 direct to Reinhold Publishing Corp., 430 Park Ave., New York 22, N.Y.

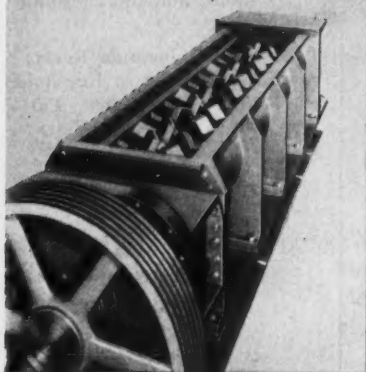
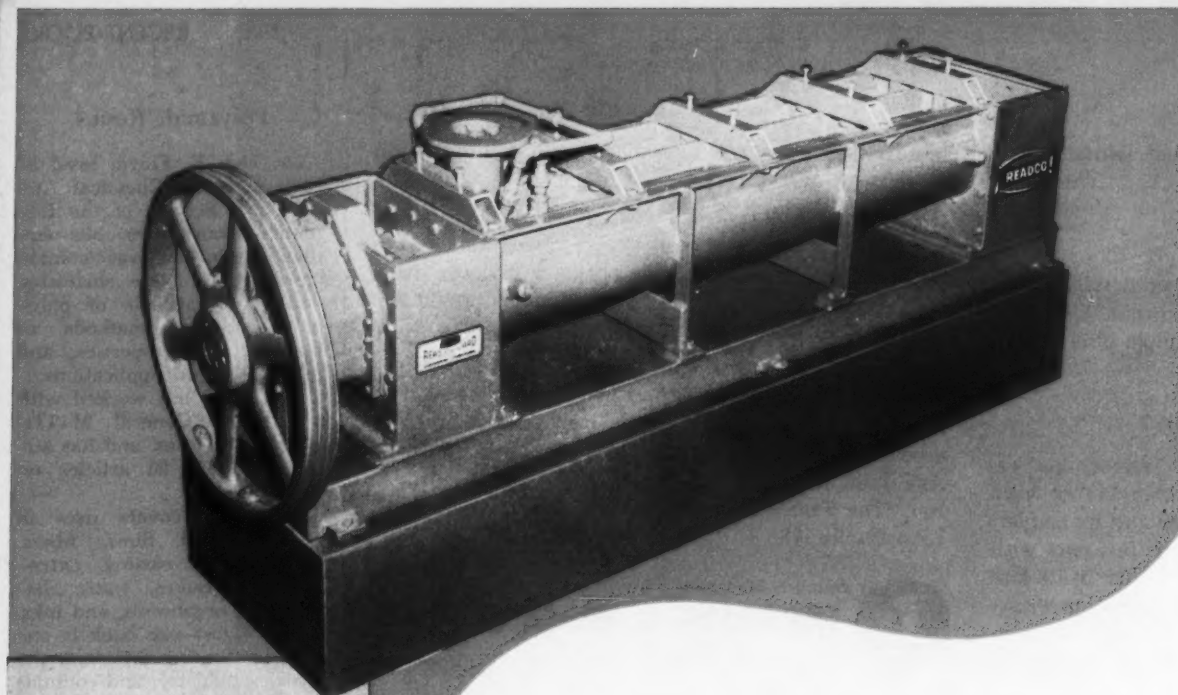
Handbook of Layout and Dimensioning for Production

Reviewed by

Professor JOSEPH A. BENNETT
University of Alabama

Hyman H. Katz, author of several books and articles, and a man experienced in training and supervision of draftsmen, has written this 479-page book to provide the skilled draftsman with information which will enable him to become a more valuable detailer and hasten his progress toward the position of designer or layoutman. Text ranges from material as elementary as the sharpening of a pencil to topics that will require careful reading by experienced design engineers. The 55 tables and many of the al-

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RECENT BOOKS

most 600 illustrations are useful as reference material as well as serving to illuminate the text.

Early chapters describe role and importance of the various drafting functions in modern mass production, with emphasis on sketching, geometric construction, and layout. Major portion of book, devoted to production dimensioning, emphasizes importance of designer properly specifying all functional dimensions with appropriate allowances and tolerances. After a firm foundation of basic principles has been laid, separate chapters discuss dimensioning of the radius, the circle, the angle, and the plane. Use of datums in dimensioning is covered.

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To obtain "Handbook of Layout and Dimensioning for Production", remit \$15 direct to the MacMillan Co., 60 Fifth Avenue, New York 11, N. Y.

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Plastic Sheet Forming

Author Robert A. Butzko of The Auto-Vac Company has covered sheet forming of plastics from the point of view of the engineer and designer.

Butzko describes applications of sheet forming, the fabrication process, selecting proper materials, molds and design, commercial machinery and auxiliary equipment, decorating, production costs.

His chapter on future prospects points out that major growth will most probably be in the appliance and automotive industries and in packaging of parts.

The volume is of digest-size, and has 182 pages.

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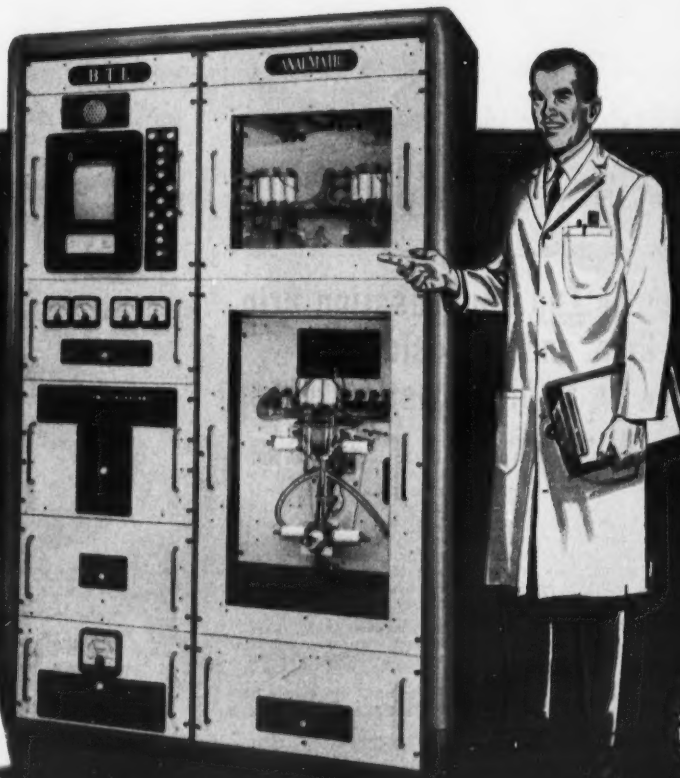
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New "Series 16" magnets proved strongest, most efficient units made . . . provide ultimate in operating advantages at price of ordinary magnets

New HI-POWR magnets give you a new "high" in protection against tramp iron damage or contamination by iron fines. Protects machinery, prevents product contamination, reduces downtime, increases production.

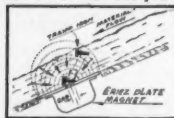
Exclusive Eriez design and construction provide peak magnetic efficiency and performance—actual tests show "Series 16" magnets trap and hold more metal from material flows than other units. Heavy duty non-removable extruded aluminum cover takes the roughest use . . . increases structural rigidity . . . prevents pilfering or tampering with magnetic circuit and loss of magnetic power.

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Magnetic SEPARATION AUTOMATION VIBRATION Equipment

ERIEZ

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Spotlight On People

Allied Chemical's Barrett Division will be separated into two groups, Barrett Division and Plastics and Coal Chemicals. Heading up the new Barrett Division, which will handle lines of roofing, and building and paving materials, will be H. DORN STEWART. Plastics and Coal Chemicals will be headed up by T. J. KINSELLA. Kinsella has been president of the original Barrett Division since 1952.

O. V. TRACY, vice president and director of Esso Standard Oil Company, was awarded the honorary degree of doctor of science by Clarkson College of Technology. Clarkson also named Tracy to its board of directors.

DONALD J. COLLINS is appointed general sales manager of Tennessee Products & Chemical Corporation.

EUGENE J. SULLIVAN is promoted to executive vice president of Borden Chemical Company.

WILLIAM C. LYTLE is elected vice president of Atlas Powder Company.

Monsanto's organic chemicals division promotes ARTHUR P. KROEGER to director of marketing.

The chemical division of Food Machinery names DR. HANS O. KAUFFMANN director of research and development for the inorganic chemicals department, and DR. OSCAR H. JOHNSON director of research and development for the organic chemicals department. And at FMC's Becco Chemical Division, ALBERT P. SHUTTS becomes sales manager.

L. M. MILLER is promoted to newly created position of sales manager for aliphatic organic derivatives department of Armour and Company chemical division.

International Minerals & Chemical Corporation's board of directors elects THOMAS M. WARE president. He succeeds his father, LOUIS WARE, who is elected chairman of the board and chief executive officer.

THAT'S
INTERESTING

Cancer foe

Tetrazoles are compounds that are potential cancer cures. Dr. Robert M. Herbst, MSU's professor of Organic, is enthusiastic about biological potential shown by these compounds. In cancer fight, they mimic the acids that are necessary to cell life and poison cancer cells which accept them as real acids.

'Zip' fuels resisted

Petroleum and fluorine based ersatz rubber may solve heat and corrosion problems in jet aircraft and missiles. New material withstands heat to 400°F for more than 100 days.

It also takes 25 hrs of 600°F temperatures.

Resistant to "zip" missile fuels, as well as most corrosive chemicals and solvents, it is presently used in aircraft seals and gaskets. (*Chemical News*, Manufacturing Chemists' Association)

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Solvents to fit your formulation —just specify the properties you need

Among the high-quality glycol-ethers, esters, alcohols or ketones available from CARBIDE, there is one—or a combination—that is just right to give your product the best balance between cost and performance.

Your solvent might be one—or several—of CARBIDE's 11 CELLOSOLVE and CARBITOL glycol-ethers. Their non-foaming property, high solvent power, low viscosity and low degree of odor make this group of solvents suitable for use in easy-spreading, color-retaining latex paints. If you use esters in your formulation or process — you have a choice of 25 CARBIDE esters — for example, ethyl acetate, isopropyl acetate, or butyl acetate. And, for a wide range of applications — from lacquers to drug extraction — there are two dozen alcohols and 14 ketones available from CARBIDE.

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To help you choose the best solvent, coupler, plasticizer or diluent for your requirements, we've prepared a six-page booklet, the "Solvent Selector." Ask for a copy from your Technical Representative or write Union Carbide Chemicals Company, Division of Union Carbide Corporation, Room 328, Dept. H, 30 East 42nd Street, New York 17, N. Y.

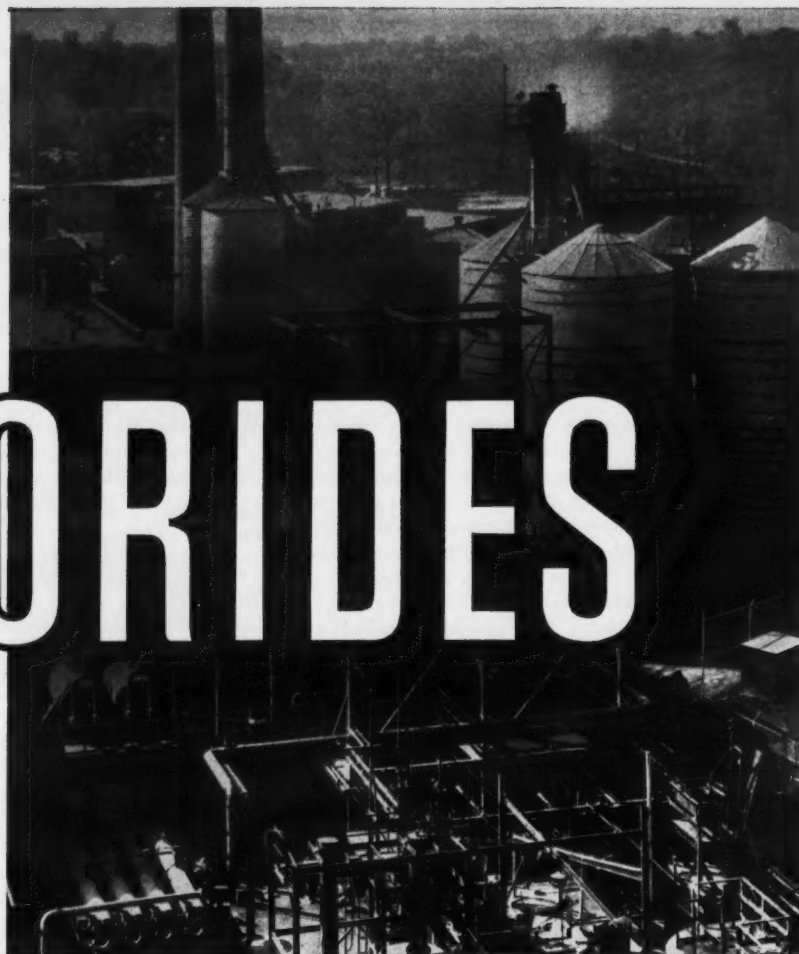


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Hydrofluoric Acid Anhydrous

Hydrofluoric Acid Aqueous
Hydrofluosilicic Acid
Lead Fluoborate
Metallic Fluoborates
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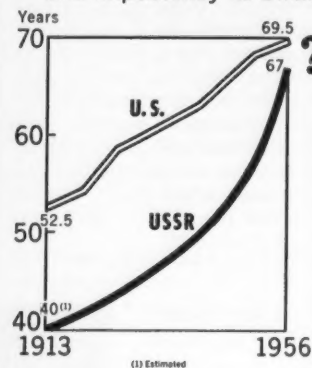
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CONSIDER THESE CHARTS

Despite the fact that the West has discovered every major drug group — while the Soviet's score is zero — Moscow has been aggressive-

LONGEVITY RACE

Life Expectancy at Birth

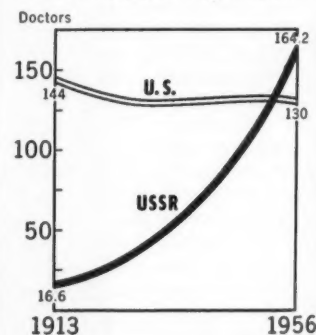


ly pushing medical education and practice to a point where longevity is almost equal to ours.

Compare the rate of increase in life expectancy in

DOCTORS

Per 100,000 Population



the accompanying chart. Note how the Russians are closing the gap — note, too, the number of doctors per unit of population. These data can easily mean that the Communists plan one day to "export" their medical talent to the underdeveloped countries in an effort to win them to the Red fold — promising good health in exchange for freedom.

John T. Connor, President
Merck & Co., Inc. urges

LET'S EXPORT AMERICAN MEDICINE

... as a potent instrument
of U. S. foreign policy



Recently before the 86th Meeting of the Manufacturing Chemists' Association at White Sulphur Springs, Mr. Connor asked this chilling question — "Is the Soviet system of medicine, along with the enormous support and loyalty it generates, exportable to the underdeveloped countries of the world?"

Here in condensed form is his answer and his proposal that our pharmaceutical and our medical skills be used as a powerful weapon to win peace.

Today we are proud of our contributions to the health of the American people. But we must look and be conscious of the work which the Russians are doing along this line. The following, dependent for the most part upon Soviet sources, should be accepted

with caution.

I am not concerned with the potential criticism of those who hold that failure always to condemn everything Soviet is tantamount to approval and failure to praise everything American is equivalent to criticism. Frank discussion is as important in medicine as it is in every other aspect of life.

The Soviet Theory

The theory of the organization of Soviet medicine assumes that a sick man is a parasite. He cannot shoulder a gun, run a tractor, tend a machine, or launch a satellite. So if Commission were to survive, Russia had to be strong and thus had to improve the health of the people.

Since the revolution in 1917,

the Bolsheviks have looked upon disease as an enemy of the State. So they have seen a direct connection between health, life expectancy and industrial progress. At this time the estimated life expectancy of the average Russian at birth was about 40 years. Thus a short life meant that State would get relatively few years of productive activity. The Soviet Union chose to improve the health of the nation and lengthen life expectancy to Western levels.

They launched a nationwide campaign of sanitation and public health education, built hospitals and established clinics in plants, offices and collective farms. Medical schools were set up to mass produce general practitioners, public health doctors and pediatricians. The pharmaceutical industry was ordered to try to copy Western drugs.

The Soviet Doctor

A closer look at the major aspects of Soviet medicine

shows that three out of four physicians are women. After ten years of intensive elementary and secondary education, including four years of chemistry, five of physics and six of biology, the prospective Russian doctor goes directly into medical school for six years. She pays no tuition and receives a yearly stipend from the State, plus a bonus for good marks. Her loyalty belongs to the State and for the rest of her life she is its employee and subject to its dicta.

According to Russian statistics, about 16,000 physicians are turned out each year, or more than twice as many as the United States. Before the Revolution there were about 17 doctors for each 100,000 people in Russia and by 1956, 25% better than ours: 164 per 100,000 people, compared with 130 per 100,000 in the United States.

Compare the American doctor, who has had 22 years of education, which includes two years of internship and residency, before he starts to

Every American chemical manufacturing executive will recognize the tremendous good that John Connor's proposal could bring to underprivileged peoples — to the world weary of tensions and wars.

Here too are great opportunities to win greater appreciation of our American chemical industry as a whole.

practice. His Russian counterpart has had only sixteen. Well qualified specialists are still scarce in the Soviet Union. And the average Russian doctor is backed by poor facilities, equipment and research. He has far fewer modern drugs and instruments at his disposal.

Russia's rate of progress is exemplified by its enormous hospital construction program. By 1956 the Russians claim that they had provided 1,360,000 hospital beds, or about 7 for every 1,000 persons. This still does not come up to the U. S. ratio of nearly 10 beds for every 1,000 persons. At the current rate the Soviets should be able to close the gap in less than five years.

Soviet Drugs

I have searched rather diligently and have yet to unearth a single important drug that the Russians have developed on their own. They admit this. In the summer of 1956 the official text of the five-year plan for pharmacology made this confession: "In the search for new therapeutic agents, (the Soviet Union) still lags behind the large capitalist countries."

The accompanying chart shows that every single major drug group developed since the Russian Revolution was discovered by the West: the antidiabetics, vitamins, sulfa drugs, antibiotics, hormones, anti-hypertensives and mental health drugs. The Soviet's score to date is: Zero.

The reason is quite simple.

DISCOVERY OF DRUGS

Since the Russian Revolution

DRUG GROUPS	The West	USSR
Anti-Diabetics	Ⓡ	○
Vitamins	Ⓡ	○
Sulfa Drugs	Ⓡ	○
Antibiotics	Ⓡ	○
Hormones	Ⓡ	○
Anti-Hypertensives	Ⓡ	○
Mental Health Drugs	Ⓡ	○
TOTAL	7	0

Moscow found that it was far less costly to pirate Western drugs than to discover and develop their own. Many millions of dollars are usually required in research, development and testing, before an American pharmaceutical company can deliver a major new drug.

Pirating drugs is not an easy game. Some of our most important new drugs are extremely difficult for even our own highly developed pharmaceutical industry to manufacture, and have turned out to be too complex for the present skills and facilities of the Russians.

For example, cortisone, which, I am pleased to point out, was first synthesized in a practical way a full decade ago by a young Merck chemist, Dr. Lewis Sarett, following the trail-blazing work of Dr. E. C. Kendall. The Russian pharmaceutical industry is still fumbling with it ten years later. In contrast, Merck's competitors here at home were so highly developed that it took them only a short time after being licensed to get into the cortisone competition. Some of them even took the lead with their own improvements.

Soviet Opinion

What do the Russians themselves think of the medical treatment that they receive? Even refugees from Soviet tyranny are sold on it, as pointed out by Dr. Mark Field of the Russian Research Center at Harvard, author of the recent book, "Doctor and Patient in Soviet Russia." He discovered this when he interviewed 1,650 of them in Germany and the United States. The main reason apparently is that medical care has been used from the beginning by the Kremlin, not only to raise the productivity but also to make propaganda for the Party. This propaganda has left its mark. From the point of view of popular approval by the Russians themselves, the Soviet health program may well have been the most successful innovation the Russians have

introduced in the 40 years since their Revolution.

A Chilling Question

Let me now ask a question. It is a rather chilling one and I am not yet sure of the answer. Is the Soviet system of medicine, along with the enormous support and loyalty it generates, exportable to the underdeveloped countries of the world? I have no doubt that the Russians are getting ready for export, otherwise they would have begun by now to slow down their production of doctors, nurses, and other health personnel, who now number about 2,750,000 persons — or better than one out of every hundred citizens.

The Soviet Results

There is no yardstick that will measure all the aspects of a nation's health. The one that comes closest is the longevity rate or the average length of life. Fortunately the Soviets have recently published some information on longevity, so that we now have a basis for comparison.

First let me give you two guideposts on Russian statistics. They are nowhere near as valid as our own since they are based on incomplete information and no raw data are available with which to cross check the conclusions. Then, the experts warn us that Russian statistics are not pure fabrication.

This is what Madame Kovrigina, Minister of Health, Soviet Union, told the Congress of the Supreme Soviet last fall: "As a result of the steady rise in the economic power of the Soviet State and of the ceaseless concern of the Party and Government with the development of public health, there have been great improvements in the state of the people's health . . . The level of life expectancy in our country has risen from 32 years in 1896-97 to 44 years in 1926-27 and to 67 years in 1955-56."

Most of the Soviet progress has been made in fairly re-

cent years. By 1927, their longevity rate was still more than a quarter of a century behind ours. By 1956 this had grown to within reaching distance: a life expectancy at birth of 67 years compared with 69.5 in the United States.

The above in itself is not unique. Our own territory, Puerto Rico, with its Operation Bootstrap, has done even better. In just 15 years it added 50% to the average length of life. By 1955 it had passed the Soviets and reached a life expectancy of 68 years. All this was accomplished, not by sacrificing freedom, but by extending it.

Secondly, the Russians have made most of their progress in longevity simply by borrowing Western methods of sanitation and a control of contagious diseases.

Before I discuss the future, let me put it within the context of the Soviet Union's long term growth. We've always thought that our massive, dynamic economy — still twice the size of theirs — would give us enough surplus to take on any new challenge from the Russians, be it the production of weapons, the education of scientists or the lengthening of life. But can we be so sure?

For too many years I, for one, have been focusing my attention on the weaknesses of Soviet economy and brushing off the evidence of its enormous vigor and its growing strength. For thirty years now, ever since the first five-year plan was launched in '28, the Russians have expanded their economy at a rate twice as fast as ours, despite the devastation of World War II. We would do well if we took seriously the inaugural promise Nikita Khrushchev made when he became Premier in March and said: "We shall conquer capitalism with a high level of work and a higher standard of living."

To page 27

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The Arithmetic of Materials Handling



Developed by Fuller, American Sugar's new Airveyor Bulk Transport Trailer permits high speed, low cost loading and unloading of Domino sugar.

AMERICAN SUGAR DELIVERS IN BULK WITH NEW FULLER **AIRVEYOR** TRANSPORT

When American Sugar Refining Company recently turned to Fuller-Airveyor Bulk Transport Trailers for delivering sugar to the Long Island City plant of Louis Sherry Preserves, Inc., they not only eliminated bag-handling, but also did away with lift trucks, scrolls, bucket elevators, and many wasted man hours.

One man now unloads 30,000 pounds of Domino bulk sugar in less than a half hour — and stores it 150 feet away. The Airveyor Bulk Transport Trailer does all the work. Waste and contamination are eliminated.

Fuller Airveyor Bulk Transports, like this, can be designed and built for a wide variety of dry, finely divided and

coarse granular materials from powders to pellets: sugar, starch, malt, grain, and lime, to mention only a few. The only investment required by a customer to receive material pneumatically is a storage bin and two pipe lines.

If you are now handling dry, granular materials, it will pay you to look into Fuller pneumatic conveying systems. Fuller systems are engineered specifically for your particular application. They bend around corners, run up or down, through walls and floors, almost any distance — even underground. Write or phone today outlining your problem. Fuller will gladly furnish additional information with appropriate recommendations.



LOUIS SHERRY'S STORAGE BIN for sugar, 150 feet from truck, atop Long Island City plant.



4480
A-259



"See Chemical Engineering Catalog for details and specifications".

Check 6469 opposite last page

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A few weeks even more gr when he told at a reception "Watch out, we are treading

Allen Dulles Central Intelligence has recently clear meaning America. The pansion of Rus is "the most se this country in time of pea lence, in blun make the Uni a second-class

The dimer threat to fre clear. They across the spee needs. If the S meet these ne ciently than v at least in the the allegiance kind.

One of the r tal of these n I have been good health an long life. The has made giga ward filling thi Should it cont rate of progr five years and porting trained to sell Commu ly way to fight surely be tre tails as we sea among the people of the remember tha stretch of histo ranked with h worst enemy. V run a poor thi

Let me tran the eloquent Thomas A. book, "The E row," was pub Dr. Dooley ha Navy physicia 1954 when he skilled enliste teered for the of giving pri care to half a gees streaming North ahead o nists. This is w

"We had sec der loving care kind of medicin

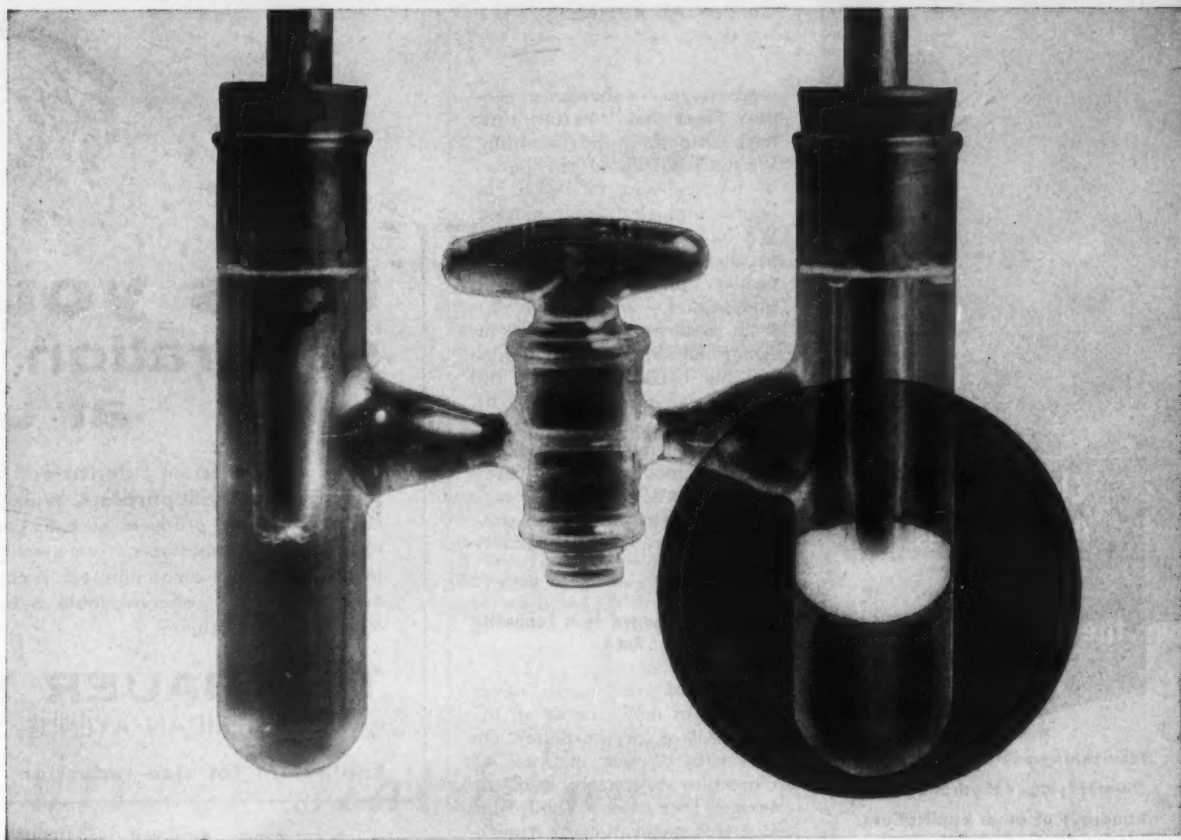
weeks later he was more graphic about it. He told our Ambassador reception in Moscow: "Look out, Mr. Thompson, I'm treading on your tail." Dulles, Head of the Central Intelligence Agency, recently spelled out the meaning of this for America. The economic expansion of Russia, he warned, is the most serious challenge our country has ever faced. "The challenge of peace," That challenge in blunt words, is to bring the United States into the first-class power.

The dimensions of the need for freedom are now stretching right across the spectrum of human life. If the Soviet Union can meet these needs more efficiently than we can, it will, in the short run, win the allegiance of most of man-

kind. One of the most fundamental of these needs is the one we have been talking about: health and a reasonably long life. The Soviet Union is making gigantic strides toward fulfilling this need at home. It continues its present rapid progress for another year and then start extra-trained medical teams to fight disease, it will be treading on our heels. We search for friends in the underdeveloped countries of the world. Let us remember that, in the long run of history, disease has been with hunger as man's enemy. War, so far, has been a poor third.

Let me translate this into plainer words of Dr. A. Dooley, whose "The Edge of Tomorrow" was published recently. Dooley had been a young physician in Vietnam in 1961 when he and four untrained men volunteered for the hopeless job of treating primitive medical needs of half a million refugees streaming down from the mountains ahead of the Communists. This is what he said:

"I had seen simple, tenacious care — the crudest medicine practiced by



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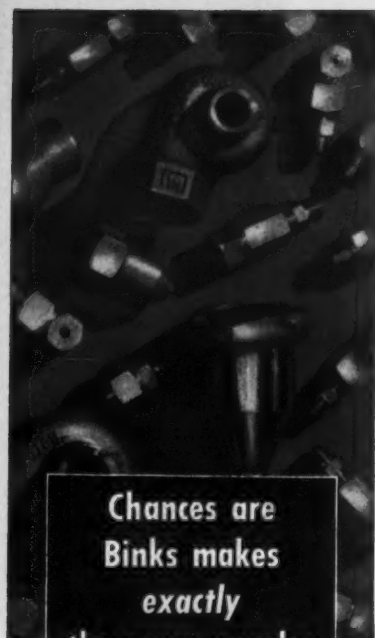
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understand.

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American doctor. But it also
left me baffled. For why did
our foreign-aid planners, with
their billion-dollar projects,
ignore the enormous possibili-
ties of medical aid? Since
those possibilities were
Christ-like in power and sim-
plicity, I could not under-
stand it."

Soviets Challenged to a Longevity Race

Most of us have never
thought of medicine as an in-
strument of foreign policy. On
this subject, our instincts as
a people are purely humani-
tarian. This is as it should be.
But this generation of Ameri-
cans is caught in the midst of
a battle to win the hearts and
souls of nations — not for the
United States, but the rights
of man. When the Soviet Un-
ion sallies forth from its bor-
ders promising good health in
exchange for freedom, shall
we be unprepared?

The future is quite clear.
The question is not whether
we will have to prepare, but
how. The most effective way
in a democracy, it seems to
me, is through a program of
public education focused on a
national objective that every-
one can understand and most
citizens will work to achieve.

A spirited competition with
the Russians in the field of
health would satisfy these re-
quirements. It would also be
in line with our humanitarian
traditions. In such a contest
the only real loser would be
disease.

Let us, then, challenge the
Soviet Union to a new kind
of competition — a longevity
race. Let us pit our patient-
oriented system of medicine
against the State-oriented
system of Russia to see which
of us can first attain for our
citizens an average life ex-

To page 111



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CHEMICAL PROCESSING

Oil refineries have been obtaining maintenance and realizing savings under a system that has come to be dubbed "contract maintenance." Under this system, a company contracts with an outside firm to supply the labor force — and management of that force — for handling maintenance of both equipment and buildings.

To learn some of the ramifications of applying such a system to the other processing industries, CHEMICAL PROCESSING interviewed one of the major firms offering contract maintenance services to industry. We talked to Alan McCone, assistant to the president of Catalytic Construction Co., Philadelphia, Pa., to get the answers.

Mr. McCone has been associated with Catalytic Construction Company for twelve years, as manager of industrial relations and currently as assistant to the president. He formerly worked in the Maintenance Division of the Sun Oil Company's Marcus Hook Refinery as a foreman, shift supervisor, and labor relations coordinator.

Catalytic Construction Company has been active in contract maintenance since 1946, and an essential ingredient in the company's success has been the labor relations directed by Mr. McCone.

The contract with the labor unions for operation of contract maintenance program at Tidewater Oil Company's Delaware Refinery was negotiated by Mr. McCone and his staff. This agreement has been adopted as the pattern for all such maintenance operations throughout the United States.

Since contract maintenance is too complex a subject to be covered in this limited space, the interview will be presented in two parts — the first part appears here and the concluding part will appear next month.

Why Contract Maintenance?

CP interviews Alan McCone, assistant to president of Catalytic Construction Co., Philadelphia



Q — We have read much about the role of contract maintenance in petroleum refining. Mr. McCone, what inroads has contract maintenance made into the other processing industries?

A — Contract for certain work in plant maintenance is common in all industries. For the most part, such contracts have been in the specialty field such as sheet metal work, plumbing, roofing, repairs to tubulars and special machinery, and other services of this general nature. Contract maintenance serv-

ices are, therefore, not so much a matter of principle as they are a matter of degree. The application of maintenance-management services is justified in all major industrial plants with sufficient payroll to establish the economics.

Q — What factors have contributed to the rise of contract maintenance?

A — Maintenance is the largest single item of operating expense in oil refineries and chemical processing plants. The average cost for maintenance in such plants is around four percent of cur-

rent plant replacement value. There is strong evidence that in most plants the maintenance function is not entirely efficient.

Formal surveys reveal a wide variety of inefficiencies, including 20 percent idle time as an average for the maintenance force. Informal surveys have elicited statements from maintenance managers that productivity ranges from 30 to 40 percent of a standard day's work.

These inefficiencies result from a number of circumstances. A primary reason is that the modern plant has been designed for maximum efficiency and operation. It has been designed to operate for longer periods between shut-downs. At start-ups and during shut-downs, maintenance demands are greater than during normal operating periods. The demands for maintenance labor force fluctuate more than they did in yesterday's plant.

During peak periods, manpower requirements may greatly exceed that available on company payroll. Obvious solution would be to add more

men to the payroll. Of course, when demand falls back to normal or below, the new maintenance force's productivity decreases.

Q — How does contract maintenance satisfy the needs of the start-up operation?

A — Tidewater's Delaware Refinery is a good example of what can happen in a start-up situation. It is impossible to predict what the maintenance requirements are going to be at start-up and once the operation reaches a steady state.

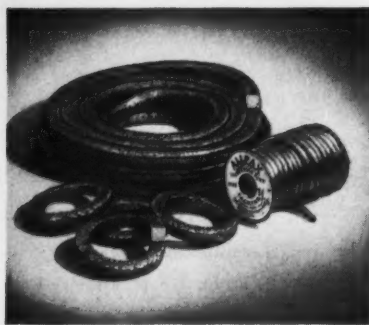
As in every start-up operation, there are peak requirements to handle immediate problems that may never occur again. Other maintenance not needed at the beginning will occur after several years of operation.

An idea of the maintenance situation in a start-up operation can be seen by studying the manpower requirement curve for the Tidewater plant (see Figure 1). At the beginning the manpower demand was, of course, very low.

The first peak was reached at the end of November 1956, with a demand of around 220

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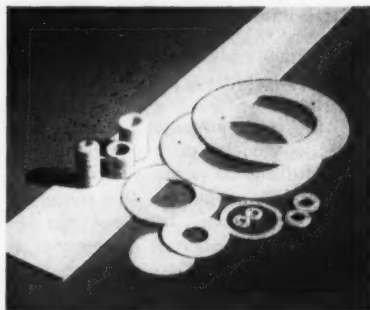


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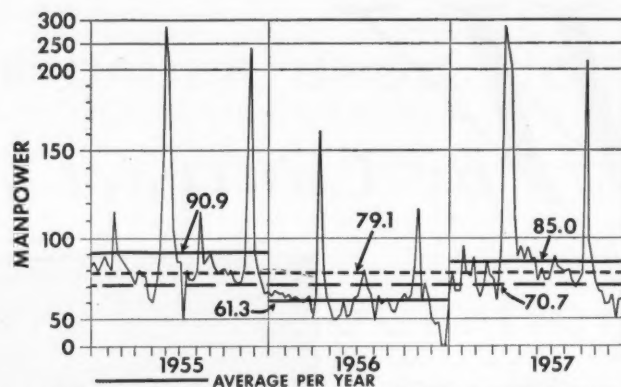
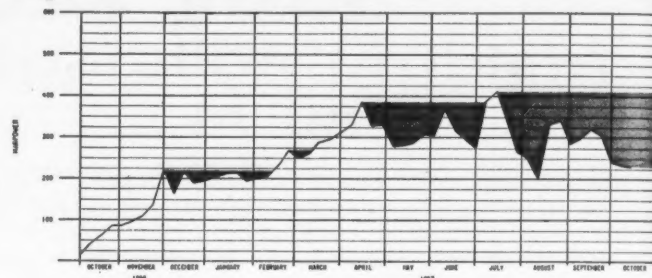
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CHEMICAL BUSINESS

Contract Maintenance — From preceding page

Contract maintenance manpower curve at Tidewater Oil Company's Delaware Refinery. Solid line shows manpower supplied to handle required maintenance operations from October 1956 to mid-October 1957. Color areas represent manpower supply differences resulting from use of contractor's flexible force as compared to size of a permanent force on Tidewater's payroll needed to handle these same maintenance operations

Fig 1



LEGEND — — — — — AVERAGE PER YEAR
— — — — — AVERAGE FOR 1955-1956-1957 INCLUDING PEAKS
— — — — — AVERAGE FOR 1955-1956-1957 EXCLUDING PEAKS

Fig 2

Contract maintenance curve for Sun Oil Company Ltd. Curve shows manpower supplied through contract maintenance to meet Sarnia, Ontario, Refinery's requirements for 1955 through 1957. Average lines show that if the refinery had committed itself to a permanent force on the basis of its 1955 average requirements, there would have been a substantial excess of manpower for subsequent operations

men. To handle this peak, Tidewater would have had this number of men on its maintenance payroll.

After that maintenance problem was rectified, the demand did not reach this figure again until the middle of February 1957. The shaded area between these dates on the chart shows manpower savings for this period. The chart, plotted to mid-October 1957, shows even greater savings over the rest of the year. Q — How does contract maintenance meet the maintenance needs when a "steady state" is reached?

A — An idea as to manpower

requirements over a longer period can be obtained by studying maintenance operations at Sun Oil Company Limited in Sarnia, Ontario. This chart (Figure 2) shows the manpower required for 1955 through 1957.

The significant fact about this manpower chart is that the average manpower furnished in 1955 was 90.0, and in 1956 it was 61.3. In 1957 it was 85.0, and in 1954 (not plotted), the first full year of operation, it was 122.4.

It is evident that if the Sun Oil Refinery had committed itself to a permanent force on the basis of its 1954 or 1955

average requirements, there would have been a substantial excess of maintenance manpower for subsequent operations.

Q — How does contract maintenance meet these needs?

A — Contract maintenance is a professional management service offering complete flexibility in manpower, tools, equipment, and supervisory staff to meet needs as they occur. Plant management, being relieved of many problems relating to maintenance operation, can concentrate on its prime function — efficient production.

Q — Contract maintenance is, then, a complete service?

A — Actually, contract maintenance may be used to varying extents. However, it is our conviction that the more completely contract maintenance services are employed, the greater are the potential savings for manufacturers.

Ed. Note— Next month, Mr. McCone and your interviewer will discuss the labor and labor union aspects of contract maintenance, and how contract maintenance mechanics are integrated with regular plant force while carrying out their jobs.

Tracking air pollution

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The Federal view on . . .

AIR POLLUTION

ARTHUR C. STERN, Chief
Community Air Pollution Program
Robert A. Taft Sanitary Engineering Center
Cincinnati, Ohio
U. S. Department of Health, Education, and Welfare
Public Health Service



The question of "states' rights" — Federal or State jurisdiction over any particular function — is as old as the Federal Constitution, and as current as the industry's pollution problems. Federal laws have made it clear that pollution control jurisdiction is primarily a state and/or local responsibility, although the Federal government enters into the picture only in instances of interstate water pollution and international air pollution problems. Some industrial quarters have expressed desire for Federal activity in more than just these areas.

In both fields, Federal agencies are deeply involved in research into pollution effects and control. They offer many technical services to states, communities, and industries.

Here, the chiefs of the separate Water Pollution Control Program and Community Air Pollution Program describe the Federal government's philosophy and activities in pollution control, and the laws under which they operate.

GORDON E. McCALLUM, Chief
Water Supply and Water Pollution Control Program
Public Health Service
U. S. Department of Health, Education, and Welfare
Washington, D. C.



The Federal view on . . .

WATER POLLUTION

THE agencies of the Federal government have a four-fold assignment in air pollution — research, technical assistance, training, and solution of international air pollution problems.

The Federal role in air pollution research, technical assistance, and training is spelled out in Public Law 159 (84th Congress) which assigns these responsibilities to the U.S. Public Health Service not only with regard to hazards to public health and welfare, but also with regard to the effects of polluted-air damage to crops, livestock, and materials, and visibility hazards to aviation and ground transportation.

Those of us who have worked closely with Public Law 159 (which became effective in July 1955 and expires in 1960) feel that it is a good law in all respects. It states clearly that *air pollution control is a state and local responsibility*. Its provisions specifying the Federal roles in

research, technical service, and training are well drafted and cause no impediment to action on the things that need to be done.

State Air Pollution Control Commissions now exist in Delaware, Florida, Oregon, New Jersey, and New York; all of them cloaked with rule-making and regulatory powers, either directly or through the State Health Departments.

In Massachusetts, the State Board of Health may assume joint jurisdiction with local health boards where air pollution sources causing trouble are outside the latter's jurisdiction.

In California, Kentucky, and Washington there is state legislation authorizing formation of county-wide or larger air pollution control districts and setting forth powers of such districts.

In several other states, including Ohio and Minnesota, previous ambiguity as to the right of the State Health Department to investigate and act on air pol-

JURISDICTION

IN authorizing a Federal water pollution control program, the Congress has made it clear that *primary* responsibility in this field rests with the States, with the Federal government in a supporting role. In the 1948 and 1956 laws, it is declared to be the policy of the Congress "to recognize, preserve, and protect the primary responsibilities and rights of the States in controlling water pollution."

The newer Act further declares it to be the policy for the Federal program "to support and aid technical research relating to the prevention and control of water pollution, and to provide Federal technical services and financial aid to State and interstate agencies and to municipalities in connection with the prevention and control of water pollution."

To implement these declarations of policy, the Federal Water Pollution Control Act:

- Authorizes continued Federal-State-interstate cooperation in the preparation and development of comprehensive programs for controlling water pollution
- Encourages cooperative activi-

ties by the States in a) prevention and control of interstate water pollution, b) enactment of improved laws to control pollution, c) establishment of interstate compacts

- Authorizes increased technical assistance to States, a broader research program, the establishment of research fellowships, and the use of contract research and research grants

- Authorizes collection and dissemination of basic data on water quality and other information relating to prevention and control of water pollution

- Authorizes appropriation of \$3 million per year for 5 years for grants to State and interstate agencies to assist in their pollution control activities

- Authorizes Federal grants of \$50 million a year (with an aggregate of \$500 million) for construction of municipal sewage treatment works

- Authorizes establishment of a Water Pollution Control Advisory Board appointed by the President

lution matters has been clarified by recent legislation.

Interstate Problems

No authority is delegated to any Federal agency to abate air pollution which originates in one state and adversely affects another state. There are 43 locations in the United States where such problems are believed to exist.

The interstate problem most recently studied is that of the metropolitan New York area. The legislatures of New York and New Jersey chose to assign responsibility for a study of trans-boundary flow of pollution in this area to an existing multi-state agency, the Interstate Sanitation Commission (New York, New Jersey, Connecticut).

Because the charters of multi-state agencies must be approved by Congress, it was necessary to obtain congressional approval of amendments to its charter to al-

low the Commission to tackle this problem. On February 1, 1958, the Commission reported its findings to the two legislatures and requested an extension of its assigned responsibility until February 1, 1959, to allow time for drafting of appropriate bi-state legislation.

Federal agencies rendered assistance to this study by providing both funds and personnel to the Interstate Sanitation Commission.

Federal jurisdiction in air pollution matters then is limited to certain problems arising along the United States-Canadian border. These problems are handled by the International Joint Commission, under the terms of a 1909 treaty. The Commission deals with its many problems through a group of Technical Advisory Boards, one of which is for air pollution.

Field studies and investigations in the field of air pollution are made for the U.S. Section of the

Commission and Board by the Public Health Service. The international problem currently being considered by the Commission is that of smoke from vessels in transit through the Detroit River.

Work on this problem, which started in 1949, is now nearing conclusion. The most recent action has been a public hearing in Detroit on February 19, 1958, to obtain comment on a draft set of recommendations intended to provide the ultimate solution.

The other Federal activities in air pollution are devoted to research concerning effect of polluted air on human health and to determine what pollutants are in the air; how they get there; how they react with each other; how they move from place to place; how they affect plants, livestock, materials, and visibility; how they disappear from the air; how they may be prevented from forming or being emitted to the air; and what communities

can do to control such formation and emission.

Research

Of the funds available for these purposes, about one-third have gone to universities and other non-governmental research agencies for research and training; one-third to governmental agencies other than the Public Health Service for research and technical assistance; and one-third to support "direct" research, technical services, and training activities of the Public Health Service itself.

Public Law 159 authorizes appropriation not to exceed \$5 million per year for five years. To date, actual appropriations have not approached this figure, and the highest so far is \$4 million for the current fiscal year.

The principal Federal agencies participating in air pollution research effort are the Weather

To bottom of page 112

OVER POLLUTION

- Modifies and simplifies procedures governing Federal abatement action against interstate pollution

- Authorizes a cooperative program to control pollution from Federal installations.

The Act thus provides a broad base for Federal cooperation in water pollution control. It is of special significance that the Surgeon General of the Public Health Service, in developing comprehensive pollution control programs, is required to give due regard to conservation of water for all purposes.

Since space does not permit discussion of all our program activities, only those areas that may be of particular interest to a chemical industry audience will be covered.

Major emphasis is being placed on research in an effort to close the tremendous gaps in scientific knowledge concerning behavior and effects of today's complex wastes and to develop adequate methods of control. The present Public Health Service research program on water supply and water pollution control problems

is carried out at the Service's Sanitary Engineering Center in Cincinnati where laboratories are equipped and staffed for advanced research in the general water-quality management field. Activities range from basic research to development of full-scale treatment processes.

Technical Assistance

Part of the Center's resources, as well as those of the Headquarters and Regional Offices, are devoted to providing technical assistance on particularly complex problems as requested by Federal, State, interstate, municipal, and other agencies. This assistance has extended to all the States and Territories and has covered a broad range of problems.

Recently, many of the States have been able to increase their programs and staffs sufficiently to answer their own problems.

In view of this, and the changes occurring in the water resources field, the technical assistance activities of the Service are being directed more and more to interstate or regional problems rather

than to problems of individual States. In the Southwest, for example, pollution by natural salt deposits and oil field brines causes a regional water-quality problem in an area that has no water to spare.

The Congress provided, in the 1956 Act, new authority for accelerating collection of basic data on water quality. The Public Health Service has initiated a long-range basic data collection program in which State and local agencies are actively participating, and is establishing a national network of sampling stations to provide base lines for measuring progress in water-quality improvements and for detecting deterioration of our water resources.

Economics

A new area for our activities, and an important one to pollution control, we believe, is economics. Public Health Service economists and engineers are working with universities, Federal agencies, and other groups in developing techniques, based on fundamental economic principles, for deter-

mining what pollution is costing local areas or regions, and the expenditures that can be economically justified for its control.

Research contracts have been made with two universities (Chicago and Leland Stanford) for supplemental studies in these areas. We are seeking acceptable ways of measuring pollution damages to both public and private users and ways of measuring dollar benefits to these users that will result from controlling pollution.

In more and more areas of the country, new economic developments or expansion of existing ones are being hampered, or prevented, by lack of suitable water supplies. In many areas this condition has been caused by pollution of the available water resources.

We believe that the plain economics of the situation will determine what steps must be taken for the good of the area. It is such yardsticks as these that we are seeking.

While the Act provides authority for Federal enforcement action to abate interstate pollution, it also declares that State

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CHEMICAL BUSINESS

and interstate action is to be encouraged in such cases. The Service is therefore placing emphasis on a cooperative program of voluntary compliance to obviate the necessity for Federal enforcement action.

The first step of the Federal enforcement procedures provided by the Act also has the objective of giving the States further opportunity to work out satisfactory abatement measures prior to formal hearings and court action by the Federal government.

This first step is a conference of State, interstate, and Public Health officials, called by the Surgeon General, to delineate the problem and discuss remedial measures. Such conferences have been held in six cases since passage of the Act, all of which have resulted in agreement on schedules of remedial action which are now proceeding according to plan. Only when this conference device fails will the full enforcement powers of the Act be invoked.

Background data on more than 100 actual and potential interstate-pollution problem areas are being compiled. Such data will provide information for use in answering inquiries and in taking enforcement action if this becomes necessary.

Advisory Groups

In developing and carrying out the Federal water pollution control program, the Surgeon General has the benefit of advice and assistance from two non-Federal groups, formally established for this purpose.

One is the Water Pollution Control Advisory Board provided for in the Act. Its nine members, appointed by the President, are representatives of State, interstate and local governmental agencies, industry, conservation groups, and other public and private agencies concerned with the pollution problem.

The second group is the National Technical Task Committee on Industrial Wastes, which was organized in 1950 to work with the Public

Check 6476 opposite last page

Health Service on industrial waste problems, to provide a forum for the exchange of information, and to stimulate needed research and encourage adoption of improved pollution abatement measures by industry.

The Committee is now composed of 62 members and alternates, representing 32 major industrial categories. It has been divided into four task groups, of which Task Group III represents the chemical processing industries. Frank Pitt of the DeVilbiss Company is 1958 chairman of this Task Group.

The Public Health Service has other responsibilities under the Federal Water Pollution Control Act, among which is the administration of the two grant programs. One, \$3 million annually, goes to the State and interstate water pollution control agencies to assist them in improving and extending their programs. The other, \$50 million annually, goes to assist municipalities in constructing necessary sewage treatment works.

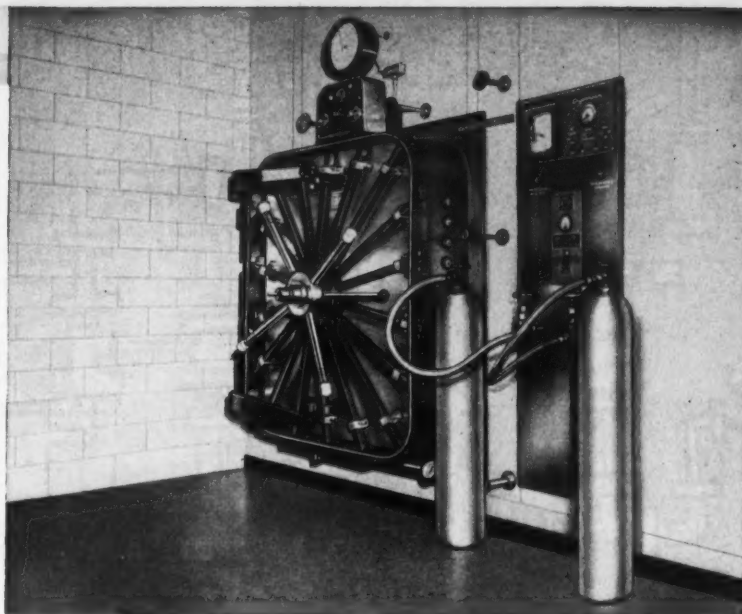
To date, \$95 million has been appropriated, and as of March 1, 913 communities had received grants totaling \$76 million to support construction amounting to an aggregate of \$362 million.

In addition, as a member of the present Inter-Agency Committee on Water Resources, the Department of Health, Education, and Welfare has responsibility for assuring consideration of quality aspects of water resources developments and for including water-quality management in comprehensive water resources development plans. Through this membership, the Department acts as liaison between Federal agencies and State, interstate, and local water supply and water pollution control agencies.

The President's Advisory Committee on Water Resources Policy, in its recommendations to him, recognized the Department's responsibilities for Federal activities relating to municipal and industrial water-supply planning and to pollution control.

Still further, the Public

Looking for authoritative answers on Ethylene Oxide Sterilization of Heat- and Moisture- Sensitive materials?



American Sterilizer installation of large rectangular autoclave with automatic control for carboxide gas sterilization of heat- and moisture-sensitive materials. Routine sterilization with pressure steam is also accomplished automatically in this unit. Other equipment available ranges from the 16"x16"x30" self contained Cry-O-Therm to 60" x 66" x 120" single- or double-door models.

WHY ETHYLENE OXIDE?

As long as ten years ago, American Sterilizer researchers settled upon Ethylene Oxide (inerted with suitable diluents) as the agent of choice for the rapid and dependable sterilization of heat- or moisture-sensitive materials. Advances in such varied fields as pharmaceuticals, surgical supplies and packaging have greatly broadened the range of applications for which this versatile sterilizing agent is recommended. But they have also clearly signaled the need for a precise relationship between such factors as temperature, humidity, pressure, exposure, concentration and diluents in effecting optimum conditions for each specific application.

WHY AMERICAN STERILIZER?

Our ten year study of the characteristics of Ethylene Oxide has been paralleled by an equally thorough development of instrumentation. As a result, American Sterilizer techniques and installations are successfully serving an ever-widening range of industrial and commercial processes requiring the sterilization of heat- and moisture-sensitive materials.

Because we have accumulated the largest body of data and experience in this field, we can advise you authoritatively. Because we offer the broadest range of automatic equipment for standard or special application you enjoy significant benefits of economy and continuing efficiency.

SEND FOR THIS FREE BASIC LITERATURE

Basic literature on "Ethylene Oxide Sterilization for Industry" is available upon request. Engineers of our Scientific Division are "on call" for consultation on processes, techniques or packaging and Experimental and Pilot Plant facilities are available through our Research Division.

Write for Bulletin 1C-602



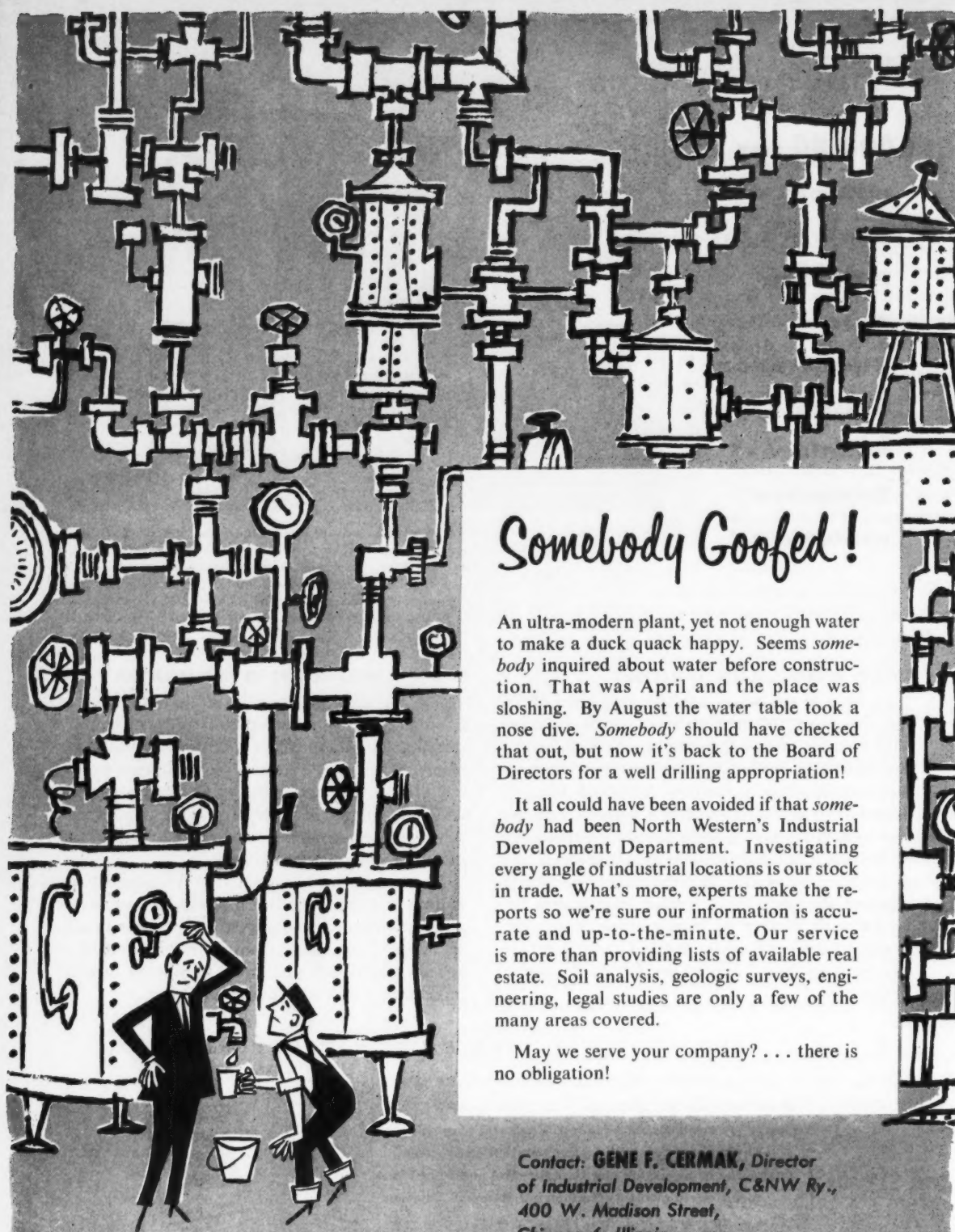
AMERICAN
STERILIZER

ERIE • PENNSYLVANIA

Scientific Division



Check 6477 opposite last page



Somebody Goofed!

An ultra-modern plant, yet not enough water to make a duck quack happy. Seems *somebody* inquired about water before construction. That was April and the place was sloshing. By August the water table took a nose dive. *Somebody* should have checked that out, but now it's back to the Board of Directors for a well drilling appropriation!

It all could have been avoided if that *somebody* had been North Western's Industrial Development Department. Investigating every angle of industrial locations is our stock in trade. What's more, experts make the reports so we're sure our information is accurate and up-to-the-minute. Our service is more than providing lists of available real estate. Soil analysis, geologic surveys, engineering, legal studies are only a few of the many areas covered.

May we serve your company? . . . there is no obligation!

Contact: **GENE F. CERMAK**, Director
of Industrial Development, C&NW Ry.,
400 W. Madison Street,
Chicago 6, Illinois

CHICAGO AND NORTH WESTERN RAILWAY

CHEMICAL BUSINESS

Health Service provides technical services to the International Joint Commission (U.S. and Canada), and the chairman of its U.S. Section of the Advisory Boards is a Service engineer. The Service also provides the secretariat for the National Technical Task Committee on Industrial Wastes.

The Public Health Service recognizes that the water pollution control program, in common with other national programs of this type, needs the interest and support of individuals and groups throughout the country in order to achieve its goals.

Working with industry and with advisory groups such as those referred to above, and with civic, fraternal, conservation, and other groups having State and local affiliates, the Service is endeavoring to bring about a better understanding of the pollution problem. We are confident that such understanding will result in the support necessary to provide the corrective measures required for solution of the problem.

Adequate pollution control programs to insure water resources for the Nation's future will require full cooperation from the industry-local-State-interstate-and-Federal team.

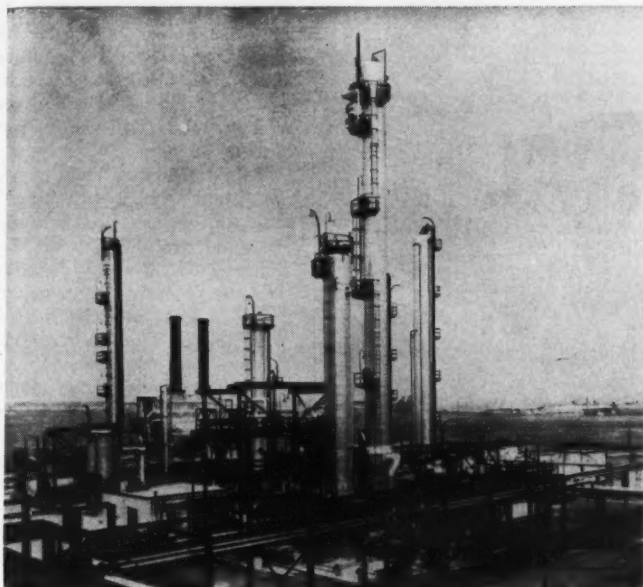
Puerto Rico affiliates net chemical profits

According to a recent report, net profits in Puerto Rico's US affiliated chemical industry are averaging 30% in relation to net sales — more than four times US average. For detailed information on wage rates, freight costs, industrial incentives, raw materials, and services see seven-page report "The Chemical Industry in Puerto Rico — Plant Survey" — Office of Public Relations, Puerto Rico's Economic Development Administration, 666 Fifth Ave., New York 19, N.Y.

Check 6479 opposite last page.

Check 6478 opposite last page

Chalk up Richfield Oil Co. As Petrochemical Producer



View of Richfield's benzene-toluene unit at its Watson refinery

Richfield Oil has made its first major move into the petrochemical field with startup of its \$6.5 million benzene-toluene unit at its Watson refinery. The unit will produce about 18 million gallons of benzene annually, nearly doubling previous West Coast production. Some 18 million gallons of toluene will also be produced, most of it to be used as a gasoline component, although a small amount will go into solvents and other chemicals.

The plant is designed to process 6100 barrels-per-stream-day of straight run gasoline fraction from the refinery.

Air Reduction has dedicated its \$9 million liquid oxygen, nitrogen, and argon unit near Boston, Mass. The 75 ton-per-day plant is the first of its kind to be put up in New England.

The plant is the fifth such unit to be constructed by Airco in recent years. Others are at Butler, Pa.; Riverton, N. J.; Chicago; and City of Industry, near Los Angeles.

Pittsburgh Plate Glass has begun operation of its polyester resin plant at the company's Ditzler Color Division facilities at Detroit. The unit will produce resins for production of polyurethane foams.

The plant augments established facilities in operation at Springdale, Pa.; Torrance, Calif.; and Milwaukee, Wisc.

Hercules Powder has increased nitric acid production by some 50 tons daily, bringing the company's nitric output to a daily 200 tons. The additional capacity is at the company's new Parlin, N. J., unit.

Process changes permit Hercules to produce a 99 percent concentrate in normal production instead of the 97 percent product of conventional manufacturing methods.

The unit uses magnesium nitrate instead of sulfuric acid as a desiccant, tray or plate towers instead of packed towers, and uses a vacuum flash evaporator as the water removal step.

Goodrich-Gulf Chemicals has announced the expansion

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Strong—rigid—requires little support or reinforcement. Can be formed into panels, discs, plates, cylinders, cones. Not injured by scraping, flushing or blowback. Does not clog or blind. Made in stainless steel, Monel, aluminum, Carpenter 20 steel.

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More Economical
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Other FERROFILTERS available for removing contaminating magnetic particles from liquids and slurries.

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BULLETIN 46-E

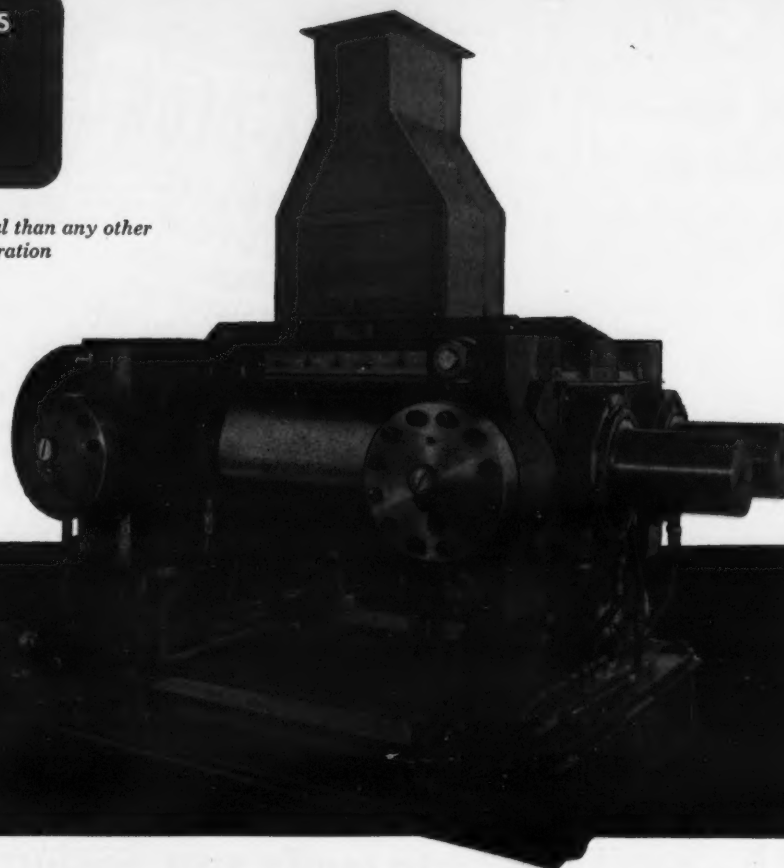
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Brunswick Pike & Kline Ave.
P. O. Box 1138 Trenton 6, N. J.

Check 6481 opposite last page

ALLIS-CHALMERS Compacting Process

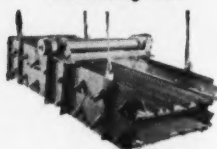
... more economical than any other
method of agglomeration



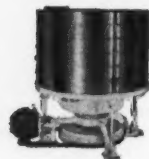
Equipment used
with compactor
or used
independently



Granulating Mill



Aero-Vibe Screen



Gyratory Screen

Upgrade for Profits ... Mechanically

Precise control of particle size, density and solubility factors is now assured with the Allis-Chalmers compacting process. The heart of this efficient, completely mechanical system is this new Allis-Chalmers compacting mill.

Converts Loss into Profit

By-product material, too fine for use, from the original process, is first densified into slabs or flakes in the compacting mill. Agglomerated product is then granulated in the roller-type mill and separated in the vibrating or gyratory screen. This conversion of by-product material into a usable product changes loss into added profits.

Get Bulletin 07B8836 for the complete story. Ask your A-C representative for a copy, or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin.

Aero-Vibe is an Allis-Chalmers trademark.



A-5582

ALLIS-CHALMERS

Check 6482 opposite last page

CHEMICAL BUSINESS

of production facilities for synthetic rubber at its Institute, West Va., plant. The additional facilities will cost around a million dollars.

The expansion will increase the company's capacity for crumb rubber, used for the manufacture of cements, mastics, and adhesives. Electrical grade rubbers and other special polymers will also be produced.

Allied Chemical has opened its plant for production of wood filled urea, the first such material produced in the U.S. since 1955. Roughly equivalent to phenolic in price, the bulk of the material will be sold for production of wiring devices and closures.

Abbott Labs has started construction on its Research Center addition, the largest single construction project in its 70-year history. The eight story structure will more than double the space available for the company's pharmaceutical research and development.

Vickers Petroleum has completed construction of its Potwin, Kan., Udex unit, the first petrochemical plant to be built by an oil company in Kansas. Products of the unit are benzene, toluene, and xylene, and other solvents. Production is expected to reach over 15 million gal annually.

Carbide Resumes Building Tech Service Lab

Union Carbide has announced plans to continue construction on its Union Carbide Chemicals Company Westchester County (N. Y.) technical service laboratory which was shelved last February. Work on the building should begin almost immediately and the lab should be ready for occupancy in late 1959 or 1960.

The main building will be a three-story structure with a total floor area of 85,000 sq ft and will house 53 individual lab units. Additional facilities will consist of a mechanical test building in which pilot plant operations will be conducted and special materials testing studies will be made.





Colgate-Palmolive Photo

Fatty acid derivatives with fabric softener action, as well as detergents with built-in odor inhibitors, vie for consumer's dollar in behalf of chemical industry

Fatty Acids In The Consumer Market

WILLIAM CLARKE
Assistant Editor

Many chemical manufacturers have looked longingly toward the consumer market because of its exciting benefits in a broadened marketing picture. Latest industrial chemical to make a successful appearance on the national consumer market is a series of fatty acid derivatives which act as fabric softeners.

Only one and one-half or two years old on the national level, marketing of fatty acid derivatives to the consumer field by chemical companies is one of the best current examples of how successful chemical marketing results can be attained.

Despite their use for many years in the commercial laundry and diaper wash industry, these ammonium salts of fatty acids and their properties as fabric softeners have not been generally known to the consumer. Indeed, misconceptions are even common today

among consumers who have begun to use them. Some consider them to be water softeners which, actually, they are not. These compounds have no effect on water nor do they act to remove any of its hardness characteristics.

Rather, these quaternary ammonium derivatives of fatty acids in the C_{16} and C_{18} group are cationic or positively charged. Their action as fabric softeners occurs because most fabric has a negative charge. The positively charged softener is attracted

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SERVICE and
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150# . . . All cylindrical fittings to 2" IPS inclusive are machined from solid forged and wrought materials. Higher sizes are machined from sound quality castings. Unions 1 1/4" IPS and over have octagonal ends.

2000#, 3000# and 6000# . . . Machined from solid drop forgings and are recommended for use where severe pressure-temperature conditions are encountered.

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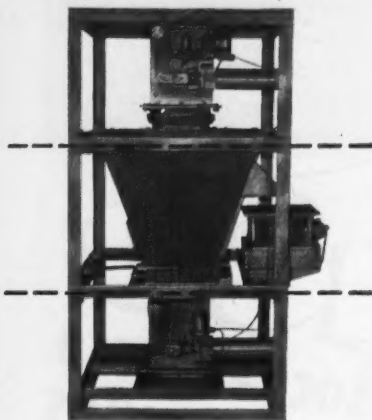
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8283 Baldwin Street
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THE W-C HOPPER SCALE



**standardized components
adapt it to a
full range of material
handling methods,
control instrumentation**

Take a good look at this hopper scale. It has many practical features for almost any weighing application.

Take the upper and lower frames. They are designed to accommodate many standardized feed and discharge components: sliding gates, vibratory feeders, screw feeders and others. These units are pre-engineered; their performance has been fully proven in use. Costs are, therefore, correspondingly lower. Satisfactory operation is confirmed in advance.

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*Write for Catalog 12.
Clear text, lots of pictures.*



WEIGHING and Control CO. MPONENTS, Inc.
206-A Lincoln Ave., Hatboro, Pa.

Check 6484 opposite last page

CHEMICAL BUSINESS

by the negatively charged fabric and a thin coating is deposited on each filament in the fabric. The result is a lubricated cloth with a fluffier appearance and feel. This is the characteristic so earnestly desired by the housewife.

Growth Curve Doubles Every Year

National sales in 1957 continued to show the growth rate these products have experienced since their introduction. Although specific sales figures are closely guarded, manufacturers admit sales of fabric softeners doubled again in 1957 over 1956 from a small start in 1955. The same rate of growth — or more — is expected in 1958.

Stress Only One Use

Because of the relative newness of the materials on the consumer market, producers of fabric softeners have not stressed more than the one use. But this marketing approach will undoubtedly change as the consumer becomes more familiar with them. The materials are much more than just fabric softeners. They are also effective anti-static agents and somewhat effective germicidal agents. Indeed, it appears that many possible uses of these materials have not as yet been developed.

Total Market

What's the market potential? An educated guess by an expert in the field is that a five year forecast would indicate a rock bottom sales figure of no less than five million pounds can be expected by 1963. (This is 100% active material. They are actually sold in alcohol and water solution.) Such a consumption figure may be extremely conservative. This amount would allow the addition of a fabric softener to only four washes a year by each one of the country's fifty million families. A further comparison is that such a minimum use figure would require only one



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Four Sizes . . . 6", 8", 10" and 12".



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CHEMICAL PROCESSING

bottle of the prepared softener be used annually in each of the 25 million electric washers in homes today. And in 1963 many more washers will be in use.

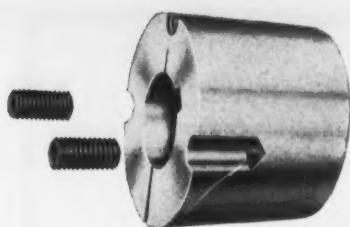
On the other extreme is forecast a maximum of approximately 20 million pounds of the 100% active, sufficient to soften 800 million washes of nine pounds each.

Based on these estimates, it is very possible a consumption figure of about 10 to 12 million pounds of the active compound will develop. Using today's prices, this could be a \$40 to \$50 million market on the consumer level. An important factor is that the above represents only the super-market and grocery trade. Industrial applications still remain and increase the total market for these fatty materials.

History

At present only two companies are in the consumer market on a national scale. These are the Corn Products Refining Company with its Nu-Soft, and A. E. Staley and Company with Sta-Puf. Corn Products entered the field in 1955 with purchase of the product line from Harshaw Chemical Company. After careful — and successful — test marketing in several areas, Corn Products went national in May, 1957. Staley entered the field at about the same time as Corn Products and has had a similar marketing pattern.

Within limited marketing areas, other manufacturers have made extended efforts. Armour and Company test-marketed a product called Balloon. Because of the ease of formulating the consumer product from the active material, many one-man organizations have started operations on a local basis. Indeed, one company, the Varney Chemical Company of Janesville, Wisconsin, has been established to develop and supply more effective compounds to those companies that wish to engage in marketing a consumer-type fabric softener.



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Change from shaft to shaft				
Change from size to size				
Change from sheaves to sprockets to couplings to conveyor pulleys				

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There's nothing like Taper-Lock for mounting wheels on shafts! First, you get off-the-shelf convenience. No reboring, no machining, no waiting!

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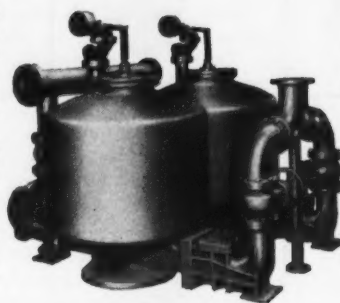


for handling domestic and industrial wastes,
pneumatic ejectors are better. . and . .

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WHY PNEUMATIC EJECTORS?

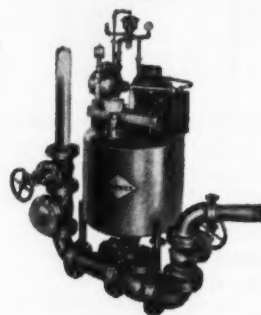
1. **Best for low gallonages.** Centrifugal pumps are efficient in larger sizes . . but for low gallonages they are inefficient. Flow is restricted . . impeller aperture is too small to pass certain solids.
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Check 6488 opposite last page

CHEMICAL BUSINESS

Problems of Introduction

Principal problem of introducing the new product to the housewife has been educational — and this process has proven to be expensive. Cash refunds of the purchase price have been typical of the promotion aids. Fabric softeners are a new concept to the housewife. Major problem is informing her just what fabric softeners are and can do. The product aids in ironing and can, in some cases, all but eliminate wrinkles after washing. It is an anti-static material and eliminates "cling" of many synthetic materials used for undergarments. But the product can be washed out of clothing during the wash cycle so it cannot be added until the final rinse. Secondly, a certain amount of agitation is necessary to distribute the softener throughout the rinse water.

Fits Present Line of Products

How does Corn Products like the addition of the laundry softener to its product line? Indications are that it fits quite well into its marketing program as the company already has laundry starches and similar products. The company is familiar with the home laundry field. Staley appears to have the same reaction.

What About the Future?

A good deal of caution is obvious in the way the companies are approaching the fabric softener market, possibly because of the unknowns in the consumer's reaction. But another unknown is the possible growth of strong competition from the soap companies which also have a natural marketing set-up for pushing a fabric softener nationally. (Latest detergent to receive benefit of this marketing know-how has built-in odor inhibitor.) Rumors are that some of the larger companies are already interested in fabric softeners. And the larger grocery chains are said to be inquiring about develop-

NO MAJOR REPAIRS IN 25 YEARS*

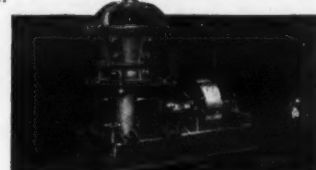
Sturtevant Construction Assures Long Mill Life at Top Loads

Sturtevant crushing and grinding machinery answers the long life top-load production problem for medium to small size plants. Many Sturtevants have been operating above rated capacities for more than 25 years, and without a major repair.

"Open-Door" design gives instant accessibility where needed — makes cleanouts, inspection and maintenance fast and easy. Machines may be set up in units to operate at equal quality and capacity.



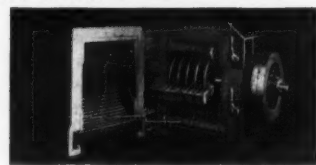
Jaw Crushers — Produce coarse (5 in. largest model) to fine (1/4 in. smallest model). Eight models range from 2 x 6 in. jaw opening (lab model) to 12 x 26 in. Capacities to 30 tph. All except two smallest sizes operate on double cam principle — crush double per energy unit. Request Bulletin No. 062.



Rotary Fine Crusher — Reduce soft to medium hard 3 to 8 in. material down to 1/4 to 1 1/4 in. sizes. Capacities up to 30 tph. Smallest model has 6 x 18 in. hopper opening; largest, 10 x 30 in. Non-clogging operation. Single handwheel regulates size. Request Bulletin No. 063.



Crushing Rolls — Reduce soft to hard 2 in. and smaller materials to from 12 to 20 mesh with minimum fines. Eight sizes, with rolls from 8 x 5 in. to 38 x 20 in.; rates to 87 tph. Three types — Balanced Rolls; Plain Balanced Rolls; Laboratory Rolls — all may be adjusted in operation. Request Bulletin No. 065.



Hammer Mills — Reduce to 20 mesh. Swing-Sledge Mills crush or shred medium hard material up to 70 tph. Hinged-Hammer Pulverizers crush or shred softer material at rates up to 30 tph. Four Swing-Sledge Mills with feed openings from 6 x 5 in. to 20 x 30 1/2 in. Four Hinged-Hammer Pulverizers with feed openings from 12 x 12 in. to 12 1/2 x 24 in. Request Bulletin No. 084.

*Reports Manager W. Carleton Merrill concerning Sturtevant Swing-Sledge Mill at James F. Morse Co., Boston.

STURTEVANT MILL COMPANY

119 Clayton St., Boston 22, Mass.

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CHEMICAL PROCESSING

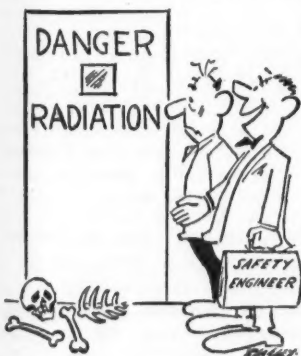
ing private label business.

What will this do to the two majors already in the field? The answer is of course difficult to assess although indications are that the market is sufficiently large for everyone — at the moment. Even with a growth in competition, companies already in the field stand to retain a good share of the consumer business as being first to make contact with the market. In any case, these fatty acid derivatives have successfully entered the national consumer market. And they will continue to fill what has been a heretofore unrecognized need.

Looking for plant site?

If you are looking for a suitable new plant site or contemplating relocating a plant, this 56-page brochure on industrial opportunities in Wisconsin may be of interest. You'll find information on the labor supply, transportation facilities, utility services, government and taxation — in other words, a balanced picture of Wisconsin's industrial climate. "Wisconsin Facts for Industry" — Division of Industrial Development, State of Wisconsin, Madison, Wis.

Check 6490 opposite last page.



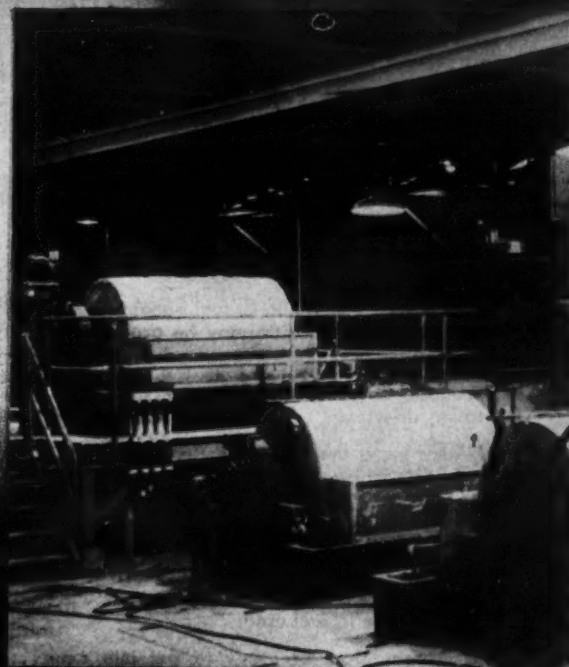
"Adds a convincing touch, doesn't it?"

Thanks to Tom Blakley, Florida East Coast Fertilizer Company, Homestead, Florida.

HANDLING ATOMIC WASTES

Handling wastes from Atom Power Plants is just another task at Eimco for waste treatment facilities designed and manufactured for all industries.

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B-317



Check 6491 opposite last page

Do you generate your own inert gases?

Using Mathieson CO₂ may be cheaper, cleaner, safer and more efficient

Carbon dioxide's wide range of inerting applications are only beginning to be utilized. Although it cannot be used in all inerting applications, CO₂ is nonetheless finding a steadily increasing market where elemental inerts—argon, nitrogen, etc.—have previously been used.

Compare the advantages of Mathieson CO₂ with the problems involved in generating your own inerts by burning out the oxygen in air to arrive at nitrogen plus carbon dioxide. Then contact your Olin Mathieson representative for full details.

GENERATING YOUR OWN INERTS

Unless precise metering of fuel is maintained at all times, carbon monoxide may be produced, or all the oxygen may not be consumed.

Produces large amounts of water vapor, necessitating driers.

Where inerts are needed under pressure, a compressor must be used.

Reserve storage is a problem in case of stoppages in the generator. Small amounts of generated inerts can be stored, but only as a compressed gas.

Sulfur compounds and other contaminants may appear, due to fuel used.

Gas generators are slow to get into action... very inflexible.

Generators are expensive to buy, operate and maintain while replacement costs are very high.

Gas generators consume valuable floor space.

Operation may create fumes, dirt, toxic gases.

USE OF MATHIESON CO₂

No metering of fuel required at all. Mathieson CO₂ is uniformly pure at all times.

No water vapor present. No driers needed.

CO₂ has high vapor pressure at all times.

Your supply of CO₂ is unaffected by stoppages in equipment or in fuel supply. Large amounts of CO₂ are stored as a liquefied gas.

Mathieson CO₂ is uniformly pure at all times.

CO₂ is available instantly at all times.

Use of Mathieson CO₂ eliminates generators and all their associated expense.

Use of Mathieson CO₂ requires little floor space or none at all.

No fumes, no dirt, no toxic gases.

HERE ARE THE FORMS IN WHICH MATHIESON CO₂ IS AVAILABLE

Size Storage	CO ₂ Vapor Volume, 100% Basis, 70°F
50 lb. cylinder	440 cu. ft.
150 lb. converter	1,319 cu. ft.
300 lb. converter	2,637 cu. ft.
1,000 lb. converter	8,790 cu. ft.
4 ton receiver	70,320 cu. ft.
6 ton receiver	105,480 cu. ft.
24 ton car*	421,920 cu. ft.
30 ton car*	527,400 cu. ft.

*For direct unloading to your process.



MATHIESON CHEMICALS

OLIN MATHIESON CHEMICAL CORPORATION
INDUSTRIAL CHEMICALS BALTIMORE 3, MD.

HERE ARE SOME OF THE IMPORTANT CHARACTERISTICS OF CO₂ VAPOR

Molecular weight	44.004
Specific Gravity	1.527 (when air equals 1) 1.557 (when N ₂ equals 1)
Absolute density	0.114 lb./cu. ft. @ 70° F.
Thermal conductivity	0.590 (air equals 1)
Specific heat	0.19 to 0.21 BTU/lb.
Volume, cu. ft./lb.	8.79 @ 70° F.
Pressure, saturated	852.5 psia @ 70° F.
Cost, 100 cu. ft.	\$0.455 (CO ₂ costing \$.04/lb.)

Spotlight on...

CHEMICAL MATERIALS

In this issue we again feature the monthly chemical materials section of **CHEMICAL PROCESSING** magazine for the fourth straight year.

Leading off, on the opposite page, is a top-level report presenting latest thinking on how to shorten the time lag from test tube to tank car in commercial chemical development. Here are the high points of a recent panel discussion by marketing management men whose job is to expedite development and utilization of new chemicals.

As a further contribution toward this goal, we have compiled a listing of chemical materials introduced throughout 1957 and the first half of 1958.

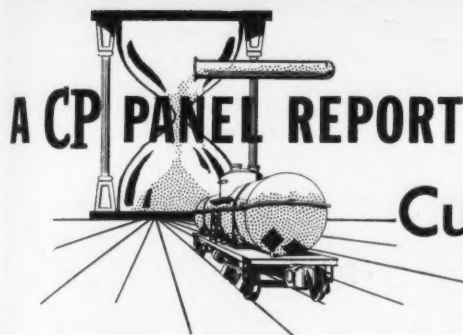
- The "Use Index", which classifies these compounds according to the manufacturer's suggested uses, is on page 50.
- Commercial Chemicals listing starts on page 52.
- Developmental Chemicals are listed separately, beginning on page 79.
- To facilitate obtaining further information, a complete list of manufacturer's names and addresses starts on page 93. You can write direct or use the Reader Service Slip opposite last page of this issue.

Of particular note is article about two just-developed tertiary acetylenic alcohols—methyl butynol and methyl pentynol—page 49.

Check 6492 opposite last page



Developing a market for a new chemical is as important for its purchaser as for the manufacturer. Here at New York's Pinnacle Club, CHEMICAL PROCESSING's panel on marketing new chemicals evaluates techniques for streamlining steps to move a product from test-tube to tankcar stage.



Cutting Test-Tube To Tankcar Time

As reported by **JOHN C. VAALER**, Editor
and **WILLIAM CLARKE**, Assistant Editor

Frequently in commercial development of chemicals, the time required to move the product from test-tube to the tankcar stage seems unnecessarily long.

Part of the problem concerns development of production facilities, but often, marketing aspects of bringing a new chemical to commercial life seem to be the prime reason for delay.

Comments have frequently been made that sampling and product evaluation are reasons for the time lag. Statements are made as "Samples were sent out two years ago, and we have yet to hear a word concerning them." And the reply is "Yes, we have the sample, but we have not received technical data or technical help as a follow-up."

To explore all sides of the test-tube to tankcar problem of commercial chemical development, which includes much more than sampling and sample evaluation, CHEMICAL PROCESSING sponsored a group discussion of the commercial development problems of new chemicals, based on a series of questions received from people in the field. Dr. Dolian, president of CCDA, acted as moderator. The following is a condensation of the three-hour discussion.

DR. DOLIAN: How can the time from test-tube to tankcar be shortened? This time lag or introduction period for new products is a universal problem to all chemical manufacturers, and one to which the answer is sought as the alchemist sought the philosopher's stone.

No company will go ahead with large expenditures to produce a new chemical until it knows the product will sell. Therefore, the question here really concerns the time necessary to reach a decision as to whether the product can be sold, and how that time can be shortened.

Product Introduction

The first question is: How much technical and use data are required on a new product before marketing can be undertaken?

Dr. BATEMAN: With increasing competition a change has occurred in the past fifteen years. This is one of the basic reasons why we are investing several million dollars

in a technical service laboratory in Westchester. Now — in addition to technical information on the compound's physical properties, it is necessary to have application information for a potential customer to suggest how the material can be used.

Mr. THRODAHL: Two points should be added. One is penetration by products already in the field. The newer the field, the less information will be available. The other modification is the customer's skill.

The company will have determined, perhaps long in advance, who the customer will be. If the customer is a small company, it may not have application research facilities. A large company, on the other hand, will not want a great deal of data beyond information needed during screening efforts.

DOLIAN: Dr. Libby, what is Du Pont's reaction to this question on technical information?

Dr. LIBBY: We prefer to see new products at an early stage with enough data to

substantiate any claims. We need chemical and physical properties, plus an adequate sample.

Dr. MERRILL: U.S. Rubber also needs the technical information mentioned, and an idea of costs.

Another thing. We suggest that the supplier not come in with six varieties of the same chemical for us to investigate. We like a preliminary screening.

DOLIAN: Will not the answer to this question differ with the customer's size and customs? In some fields the chemical manufacturer will need "use" data to receive a hearing. And there are differences between companies in the same field on this same point, with smaller companies apt to want the most complete data.

Dr. AFFLECK: We believe investment in a new product, money spent on application data or publicity, or whatever we do, should parallel the apparent marketability of the product.

If the market looks good,

Dr. J. G. Affleck
Manager
Rubber Chemicals
Department
American Cyanamid
Company



Dr. Robert L. Bateman
Dir. Market Dev.
Union Carbide
Chemicals Company
Division of
Union Carbide Corp.

H. D. Doan
Chemicals Department
Dow Chemical Co.



Dr. Frank E. Dolian
Manager
Market Dev. Dept.
Commercial Solvents
Corporation

Dr. J. W. Libby Jr.
Development Dept.
E. I. du Pont
de Nemours & Co.



Dr. Robert A. Merrill
Assistant Director
Tire Development
U. S. Rubber Company

Dr. O. M. Morgan
Dir. Chemical Sales
National Aniline Div.
Allied Chemical Corp.



Edward Schulte
Technical Director
Paint & Varnish Div.
The Glidden Company

Monte C. Throdahl
Dir. of Development
Organic Chemicals
Division
Monsanto Chemical
Company



Cutting Test-Tube To Tankcar Time

From preceding page

we can afford to do a great deal of work. We try to answer in advance all technical questions on the product, saving trouble afterwards.

If the product is a chemical intermediate, the market cannot be pin-pointed very well in advance. In this case a minimum amount of application data will be developed at minimum cost.

Mr. DOAN: Some users of chemicals require an extraordinary amount of "proof of application." This can mean the manufacturer is doing everything but producing the finished article.

Dr. MORGAN: When we introduce a new product, we recognize the need to supply application information. Yet we cannot conduct all tests needed by the customer with existing facilities. Even if we did, the customer would repeat them.

If first contact is to be at the research level, we will provide certain application data. Perhaps customer sales will want a small amount of material to sample at the actual selling point. If the material represents a new venture with an investment of capital, customer top management should know about it early, and be given the chance to request the desired information which we are best equipped to supply.

DOLIAN: What about the "exclusive agreement?"

BATEMAN: An "exclusive" depends on nature of the compound itself, amount of testing necessary, and what both the manufacturer and user will gain.

First, there must be a desire on the user's side to do something with the new product. With the increasing costs of application research, a sharing of the development expenses by the manufacturer and user is the only way of getting the new product tested. The necessity of a team effort therefore may dictate an "exclusive" for some period of time.

AFFLECK: An "exclusive"

can result from a selling problem. If a manufacturer has a product useful in an industry about which he knows little or nothing, he may ask one principal company for help. At this point it becomes a joint effort, an "exclusive." This may be the only case advantageous to the manufacturer.

DOAN: Another case in which a real drive exists on both sides to work out an exclusive arrangement is when the product's use lends a promotional advantage. If an entire industry has it, no one will touch it.

Of course, another case of

THRODAHL: An "exclusive time" hasn't been mentioned. How long is reasonable?

DOLIAN: Two or three years at most.

MORGAN: Many ideas offered around the table today point up one fact. A meeting of minds early in the game, at research, sales, and management levels, is most important to reduce the time between test-tube and tankcar.

If the product does not fit the customer's pattern or operation, sales efforts should end. But if there's a glimmer of hope the product has a future, the manufacturer will find people interested.



Listening intently to Monte Throdahl describe Monsanto's "dog and pony show", a group presentation of new chemicals, marketing panel members consider the chronological sequence of developing a chemical market

an "exclusive" results from a patent situation where manufacturer and user must work together to use the product. **MERRILL:** Sometimes an "exclusive" results from product being available only in small amounts.

An exclusive deal can have advantages to the supplier. It may be necessary to subsidize a single company to put the material on the market. This is difficult with ten or fifteen different companies.

LIBBY: I agree. And there are two indirect ways to subsidize a new end use. One is to allow a potential user to examine the material early in development. A second means of subsidization is to supply enough material for test purposes.

We dislike to pigeon-hole anything as an "exclusive." The more people with interest in a product, the healthier it will be, and the better for everybody.

However, in the case of an intermediate which we cannot test, we might consider an "exclusive" to get the product going.

Purchasing's Position

DOLIAN: What is the position of the purchasing agent in this field of new product development?

Mr. SCHULTE: Our purchasing department works very closely with our research group. If a technical representative presents an interest-

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THAT'S
INTERESTING

Falling Saucers

Saucer-like containers have been developed to drop fuel, water, and other liquids to stranded troops, explorers, etc. Containers are 30" in diam, made of rubber and have five gal capacity. They have oil-resistant liners for petroleum, rubber liners for water. Test drops of 2000' have not burst them. (Industrial Research Newsletter, Armour Research Foundation)

$H_2 + O_2 =$
power

By combining H_2 and O_2 to yield electricity, an exhibit at the Brussels World's Fair will show one of the most recent marvels of science. A fuel cell that produces electrical energy directly from chemical energy was shown by National Carbon Co., Div., of Union Carbide Corp.

For more information on product at right, specify 6493 see information request blank opposite last page.



88-007
NAME *John C.*
ADDRESS *1234*
DATE *5/1/57*
STATISTICS *100%*

File	Temp
100	107
110	106
120	105
130	104
140	103
150	102



GENERAL HOSPITAL



GOOD MEDICINE FOR INDUSTRY

PENTAERYTHRITOL IN PELLETIZED FORM

A new prescription for plants processing with pentaerythritol: Celanese Pelletized PE.

In pellet form, PE can be handled more cleanly. When reactors are charged, the problem of dusting is virtually eliminated. Up-the-stack losses disappear, and operational safety increases. In addition, tests indicate that PE in the new, pellet form handles easier—in transit... in storage—and actually helps to shorten cooking time. This development in product improvement is a typical result of the Celanese policy of doing business by thinking about yours.

Celanese®

Pentaerythritol is a polyhydric alcohol in white crystallized form. Its principal use is in the production of alkyd resins and rosin esters, which account for over 9/10 of current applications. As a major producer of PE in three grades (technical crystals, pure crystals and technical pellets), Celanese is basic in the raw materials required for this useful industrial chemical.

Basic reasons.....

Acids	Functional Fluids	Polyols
Alcohols	Gasoline Additives	Plasticizers
Aldehydes	Glycols	Salts
Anhydrides	Ketones	Solvents
Esters	Oxides	Vinyl Monomers



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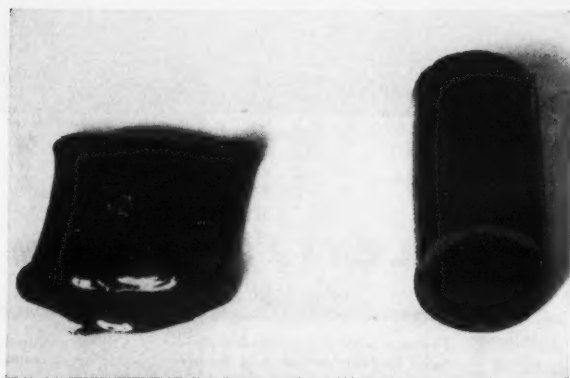
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Automotive	Pharmaceutical
Aviation	Plastics
Building	Surface Coatings
Electrical	Textiles

CELANESE CORPORATION OF AMERICA, CHEMICAL DIVISION, DEPT. 591-H, 180 MADISON AVE., NEW YORK 16
EXPORT SALES: AMCEL CO., INC., AND PAN AMCEL CO., INC., 180 MADISON AVE., NEW YORK 16



HOW HERCULES HELPS...

REPEL SUMMER INSECTS—A totally new type of insect repellent based on meta Delphene®, Hercules' diethyltoluamide, provides amazingly long protection from insect pests in spite of wiping, rinsing, and perspiration. Hercules pioneered the manufacture of the new repellent, available this season under a variety of consumer labels. These labels identify the active ingredient as diethyltoluamide, the buyers' assurance of an unusually effective product free from unpleasant odor and the "oiliness" long associated with insect repellents.



MAKE STRONGER PLASTIC—A new polyethylene-carbon black plastic is being developed by Hercules and Godfrey L. Cabot, Inc. Combining polyethylene with Cabot's thermal carbon black and Di-cup®, Hercules dicumyl peroxide, this new low-cost plastic has greatly improved resistance to heat and environmental stress cracking.



IMPROVED FOOD QUALITY—Vital Wheat Gluten, a natural protein concentrate derived by Hercules from wheat, will, because of its unique gumlike elastic property, give improved texture as well as nutritional qualities to such products as specialty breads, spaghetti, and cereals.



HERCULES POWDER COMPANY

900 Market Street, Wilmington 99, Delaware

CHEMICAL MATERIALS FOR INDUSTRY

HERCULES

Check 6494 opposite last page

CHEMICAL MATERIALS

Test-Tube to Tankcar

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ing new raw material our purchasing department will refer it to the research department immediately.

DOLIAN: Du Pont has a unique set-up for distributing information about new chemicals through the company's Development Department, doesn't it?

Du Pont's Procedure

LIBBY: To set the stage, our objectives are to work in fields where we can establish a position through research efforts and to make contributions in complex and technically difficult areas. We recognize the need for getting information about new materials and chemicals immediately into the hands of the bench chemist.

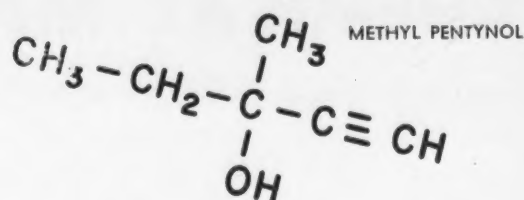
Our Development Department circulates new product reports in a mimeographed form. Often, data given us by a supplier will be reproduced completely by a photolith process. A very voluminous brochure might be abstracted.

This report is then distributed to about 250 persons, classified into six categories. One is research directors, to keep them apprised of what is happening. Others are laboratory directors, development managers, plant technical people, a miscellaneous group, and nearly 40 literature repositories, which are chiefly libraries. To the latter we also like to send complete copies of the supplier's literature.

Sufficient copies are provided to circulate the material promptly to all technical laboratory personnel. Copies also go to Purchasing. Even in very early stages, the Purchasing Department can offer sound advice on factors that become critical later on.

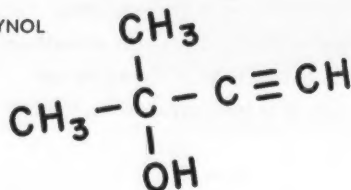
The Development Department also often aids a supplier by arranging for oral group presentations on new products to our research personnel.

If direct contacts are indicated
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Tertiary Acetylenic Alcohols

METHYL BUTYNOL



- Starting materials for organic syntheses
- Stabilizers in chlorinated organics
- Acid-corrosion inhibitors
- Brighteners in metal plating

Chemical structure of two tertiary acetylenic alcohols, now in commercial production, suggests a variety of applications.

The two compounds—methyl butynol (2-methyl-3-butyn-2-ol) and methyl pentynol (3-methyl-1-pentyn-3-ol) — retain triple bond of parent acetylene, but are completely stable, and present no handling or storage problems. In addition to triple bonds, both have two other points of reaction: at hydroxyl group and acetylenic hydrogen.

Suggested uses are:

- Building blocks for synthesis of isoprenoid chemicals for manufacture of vitamins, flavors, perfumes, and specialty monomers.

- Stabilizers or hydrogen chloride scavengers in chlorinated organics. Depending on stabilization problem, alcohols may be used alone or in conjunction with a stabilizer such as thymol or ditertiary-butyl-p-cresol which inhibits oxidative attack.

- Acid-corrosion inhibitors for mild steel and aluminum

in aqueous mineral acid systems.

- Brighteners in metals plating. Alcohols used alone or in combination with other additives result in bright and level metal deposits.

- Chain stoppers in vinyl polymerization systems. However, with increased hydrogen peroxide they function as accelerators, presumably through formation of hydroperoxides.

- Methyl butynol is a solvent for methacrylates, some polyamides, polyvinyl acetate, and cellulose triacetate.

- Methyl pentynol has hypnotic characteristics. It is used in tranquilizing fish for hatchery work and transportation.

Both alcohols are miscible with acetone, benzene, carbon tetrachloride, cellosolve, cyclohexanone, diethylene glycol, ethyl acetate, kerosene, methyl ethyl ketone, mineral spirits, monoethanolamine, neatsfoot oil, and soybean oil.

Toxicity value: LD₅₀ within 4 hr for methyl butynol in g/kg body weight (white

mice, injected interperitoneally or subcutaneously) is 3.6. LD₅₀ value for methyl pentynol by same method is 1.01.

Oral toxicity value: LD₅₀ (mice) for methyl pentynol is 525 mg/kg body weight.

In 24-hr skin absorption tests, one g of methyl butynol was applied to intact and abraded skin areas with a resultant darkening of abraded

areas. However, there were no toxic manifestations and no evidence that any absorption had occurred.

(Methyl butynol and methyl pentynol are manufactured by Air Reduction Chemical Co., a Division of Air Reduction Company, Inc., 150 East 42nd St., New York 17, N.Y.)

Check 6495 opposite last page.

PHYSICAL PROPERTIES

	Methyl Butynol	Methyl Pentynol
Appearance	Colorless liquid	Colorless liquid
Specific Gravity, 20/20	0.8672	0.8721
Refractive Index n _D ²⁰	1.4211	1.4318
Boiling Point, °C	104-105	121-122
Freezing Point, °C	2.6	-30.6
Flash Point, °F, TOC	77	101.3
Surface Tension, dynes/cm, 25°C	23.8 (pure); 41.7 (5% in water)	23.8 (pure); 34.1 (5% in water)
Solubility in Water	Miscible, forms azeotrope (BP 90.7°C) containing 28.4% water	12.8 g in 100 g water at 25°C

CHEMICAL MATERIALS

INTRODUCED FROM JANUARY 1957 THROUGH MAY 1958

This report of chemical materials introduced from January 1957 through May 1958 is divided into four sections.

Directly below, all materials are indexed by their suggested uses. On page 52, commercially available chemicals (Nos. below 500) are listed alphabetically. Products still in development stage (Nos. over 500) start on page 79. Full names and addresses of manufacturers are given in Manufacturers Listing on page 93.



CHEMICALS USE - INDEX

To locate a group of items quickly, check through this index. Then look up numbers of those chemicals classified under a specific-use heading. If material is listed as an intermediate for that end-use, it is indicated as an "Int."

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chemical specifications	
chemical	purity range
MAGNESIUM OXIDE MgO	99.40 - 99.70%
IRON Fe ₂ O ₃	0.03 - 0.06
LIME CaO	0.07 - 0.08
ACID INSOL.*	0.02 - 0.10
OXIDES** R ₂ O ₃	0.04 - 0.09
BORON B ₂ O ₃	0.0025 - 0.015
CHLORIDE Cl	0.02 - 0.08
SULFATE SO ₄	0.02 - 0.09
SODIUM AND POTASSIUM Na+K	0.02 - 0.07
LOSS ON IGNITION	Nil
*Mainly SiO ₂	
**Other than Fe ₂ O ₃	

INTERNATIONAL MINERALS & CHEMICAL CORPORATION POTASH DIVISION 20 N. Wacker Drive, Chicago 6

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Bulk density: 60 lb. cu. ft.

GRANULAR: 90% minus 12 mesh
Bulk density: 70 lb. cu. ft.

POWDERED: 100% minus 200 mesh
Bulk density: 80 lb. cu. ft.

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☐ Please send Magnesium Oxide Brochure
My field of interest for MgO is _____

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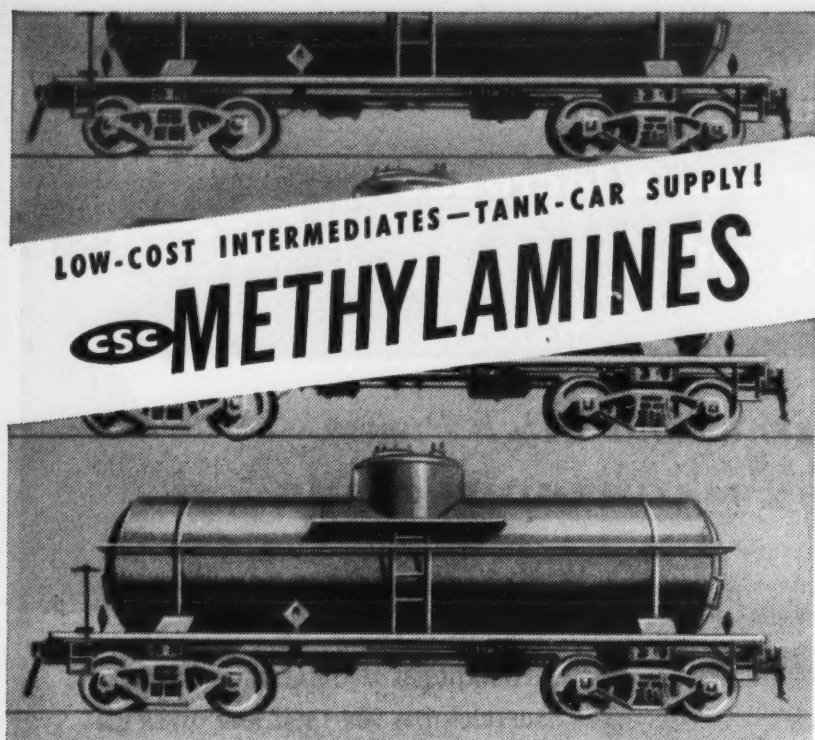
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City _____ State _____

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COMMERCIAL CHEMICAL MATERIALS

Products made available on commercial scale from January 1957 through May 1958 are listed here. List includes only those reported as "new" in composition, purity, form, other properties. If you would like additional information on any item, contact manufacturer. Full names and addresses are on page 93.



MONOMETHYLAMINE CH_3NH_2

Manufacture of amide and sulfonated amide-type detergents and surfactants. Synthesis of caffeine, aminophylline and desoxyephedrine. Manufacture of photographic chemicals, the explosive tetryl, amide-type plasticizers, ion-exchange resins, corrosion inhibitors and paint removers.

DIMETHYLAMINE $(\text{CH}_3)_2\text{NH}$

Raw material in manufacture of thiuram sulfide-type vulcanization accelerators and of dimethyldithiocarbamic acids salts used as fungicides. Neutralizing and solubilizing agent in preparation of concentrated solutions of 2, 4-D salts. Manufacture of anti-malarials.

TRIMETHYLAMINE $(\text{CH}_3)_3\text{N}$

Preparation of long-chain quaternary ammonium compounds used as softeners, lubricants and waterproofing agents for textiles. Used with benzoyl peroxide to "set" methacrylate resins. Synthesis of cationic surface-active agents.

Write for Latest Technical Data Sheet

CSC CHEMICALS FOR INDUSTRY

ALCOHOLS

Methanol Butanol
Ethyl Alcohol

AMINES AND AMMONIA

Ammonia, Anhydrous and Aqua
Ammonium Nitrate, Solid and 83% Sol.
Methylamines
Benzyltrimethylammonium Chloride
Hydroxyethyltrimethylammonium-bicarbonate

ESTERS

Amyl Acetate Butyl Acetate
Butyl Lactate Butyl Stearate
Dibutyl Phthalate Ethyl Acetate
Tributyl Phosphate

NITROPARAFFINS

Nitroethane 2-Nitropropane
Nitromethane 1-Nitropropane
Alkaterges Diamines
Aminohydroxy Compounds
Nitrohydroxy Compounds
Chloronitroparaffins

PHARMACEUTICALS, BULK

Bacitracin Cycloserine
Riboflavin, U.S.P. and U.S.P., R.S.

OTHER CHEMICALS

Acetone Formaldehyde
Pentaerythritol

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CALIF. • LOUISVILLE, KY. • MEMPHIS, TENN. • MILWAUKEE, WISC. • MINNEAPOLIS, MINN.
NEWARK, N. J. • NEW ORLEANS, LA. • PHILADELPHIA, PA. • PITTSBURGH, PA. • PORTLAND, ORE.
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COMSOLMEX, S.A., MEXICO 7, D.F. • IN CANADA: McARTHUR CHEMICAL CO., MONTREAL, QUE.



1) ACETAL RESIN — Delrin 500X, 150X cylindrical molding powders for injection molding, extrusion. Dimensionally stable. Du Pont.

2) ACETYLATED LANOLIN ALCOHOLS — Acetolan. Penetrant, emollient for skin, hair cond. Am Cholesterol.

3) ACETYLATED LANOLIN ALCOHOLS RICINOLEATE — Ricilian C. Hydrophobic emollient. Unusual penetrating prop. Am Cholesterol.

4) ACRYLIC LATEX — Exon XR-162. 48% solids. Air dry film former. Exterior paints, paper and cloth coatings. Firestone.

5) ACRYLIC LATEX — Exon XR-163. 48% solids. Paper, fabric coating. Light stable, air dry film. Firestone.

6) ACRYLIC SIRUP — Lucite liquid laminator. Weatherability, impact, abrasion resistance. Du Pont.

7) ACRYLOID B-44 — Acrylic ester polymer 40% in toluol. Coatings for metal, fabric, paper. Rohm.

8) ACRYLOID K-120, KM-220, & KM 227 — Acrylic polymers. Processing aids, modifiers for vinyls. Rohm.

9) ACRYLON P-6N — Acrylic polymer in water. Sizing agent for Dacron. Rohm.

10) ADENOSINE 5'-DIPHOSPHATE, SODIUM — Chromat. Bio research. Schwarz.

11) ADENOSINE 5'-PHOSPHORAMIDATE, SODIUM — Chromat. Bio research. Schwarz.

12) AFROX — Non-ionic surface active for air drilling of oil. Removes water, mud blocks. Atlas.

13) AGRIMUL N4R, N4S — Emuls organic phosphate insecticides, ester weed killers. Nopco.

14) ALKANOLAMINE COND — 934. Liquid. Pigment wetting agent for alkyds. Prevents floating, flooding. Witco.

15) ALKYL ARYL SULFONIC ACID — Tenn-Acid 820, 873, 864, 855. Tech. Int for liq, low cloud-pt detergents. Tennessee.

16) ALKYL ARYL SULFONIC ACID, AMINE SALT — 918. Liquid. Emuls, wetting agent latex paints. Aids coloring, prevents floating. Witco.

17) ALKYL DIMETHYL BENZYL AMMONIUM CHLORIDE — BTC-776 50%. Biocide for sea oil recovery water flooding. High activity slime organisms. Onyx.

18) ALKYL DIMETHYL, BENZYL, ETHYLBENZYL AMMONIUM CHLORIDES — BTC-2125. 50%. Biocide, fungicide. High activity, hard water tol. Onyx.

19) ALUMINA SILICATE, HYDROUS — Microcite. Rubber compd agent, paint filler, fertilizer coating. Neutral, non-hygro. Summit.

20) ALUMINUM GRANULAR — 99+%. 150-X, 200-X, 300-X. Increased flow-rate and reactivity. Reynolds.

21) ALUMINUM PIG — 99.99%. MP 660. High purity for catalysts. Reynolds.

22) ALUMINUM HYDROXIDE-MAGNESIUM CARBONATE COPRECIP — Pharm. Dried gel type F-MA11. Antacid. Non-toxic. Reheis.

23) ALUMINUM OXIDE — 99.5+% Al_2O_3 . MP 2040. Corundum form. Epoxy filler. Ceramics raw matl. High density. Alcoa.

24) AMBERLITE IRA-402 — Strongly basic quaternary ammonium anion exchange resin. Rohm.

25) AMBERLITE LA-1 — Liquid anion exchanger for hydrometallurgical work. Rohm.

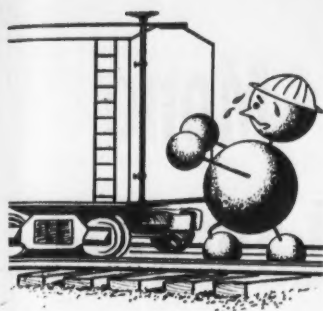
26) AMBERLITE LA-2 — Liquid anion exchanger for continuous countercurrent process. Rohm.

27) AMBIDEX — Oil sol surface actives. Dk brown or lt amber liquids. O-in-W or W-in-O emuls. Carlisle.

28) AMINES — Sipene SWU, High mw tert amine with difunctional hydroxyls. 98-99%. Mod, cat for urethane foams. Light color. Am Alcolac.

29) 2-AMINO BENZENE SULFONIC ACID — Tech. MP 335. Dye int. Non-tox. Am Cy.

Check 6497 opposite last page



30) γ -AMINO BUTYRIC ACID — 98%. Mediator of central nervous system activity. Pharm int, peptides. General Mills.

31) 2-AMINOETHYLISOTHIOURONIUM BROMIDE • HYDROBROMIDE — MP 188-189. Protects animals against radiation damage. Stable. Schwarz.

32) AMINOETHYLPIPERAZINE — Amine AL-2. 60-65%. BP 189-277. Epoxy curing agent. Int corr inhib, dyes, emuls, textiles. Low price. Jefferson.

33) AMMONIUM DIURANATE — Crude, refined. Int uranium oxides. 2-22% $(\text{NH}_4)_2\text{U}_2\text{O}_7$. Wide assay avail. Mallinckrodt.

34) AMYLOPECTIN FRAC OF STARCH — Ramalin. Pure food grade. Coatings, sizing, adhesives, flocculation, thickening. Stein Hall.

35) AMYLOSE FRACTION OF STARCH — Superlose. Pure Food grade. Coatings, adhesives, gels. Insol films, high strength. Stein Hall.

36) ANTIFOAM F-20 — Food grade. For caustic cleaning and peeling soln. Stable in alkaline pH. Non-toxic. Hodag.

37) ANTIFOAM S-118 — Tech liquid. Based on vegetable oils. Non-toxic to organisms. Ind waste treatment. Hodag.

38) ANTIFOAM TBX — Food grade for starch, dextrine, protein coatings and adhesives. Non-toxic. Hodag.

39) ANTI PERS AL #1 — CP. Prevents perspiration odors. Carolina.

40) ANTHRACENE — Refined. MP 217.5. Intermediate. Barrett.

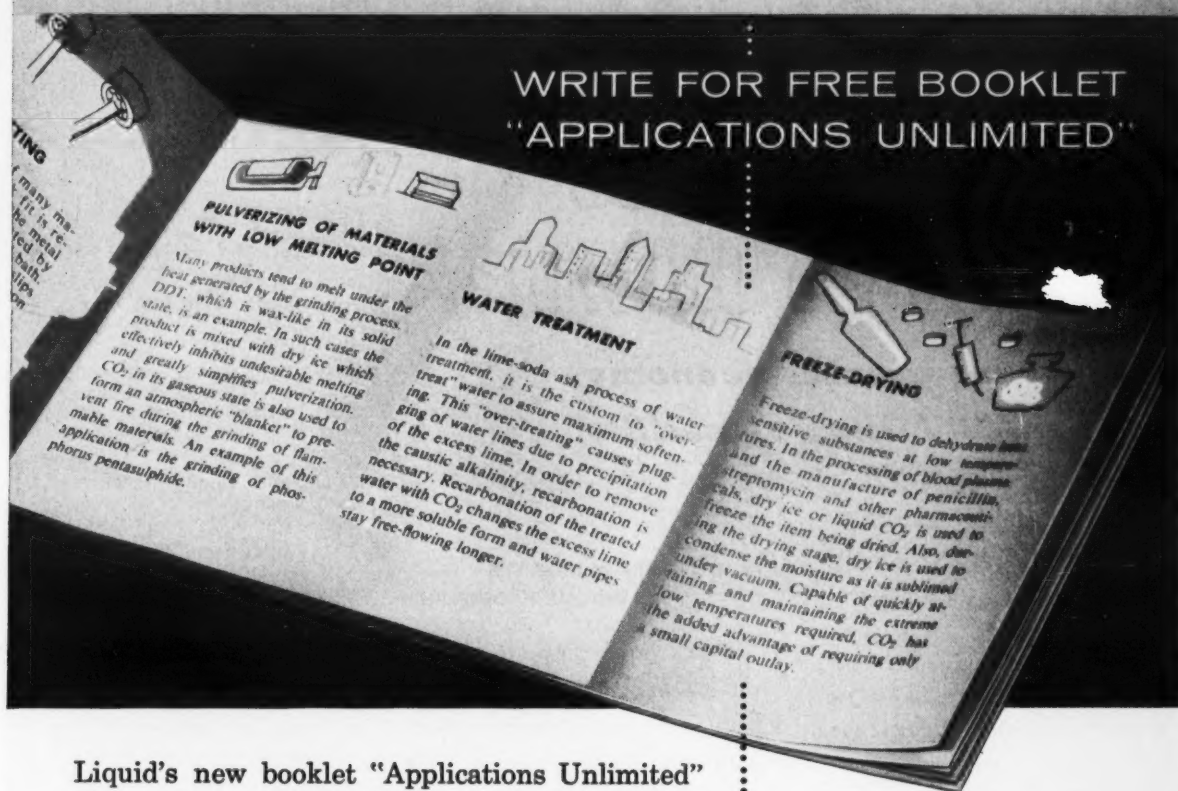
41) L-ARGININE — 99%. Free base. Prep peptide, other salts. Reactive amino, guanidino centers. General Mills.

Unless otherwise specified . . .
Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

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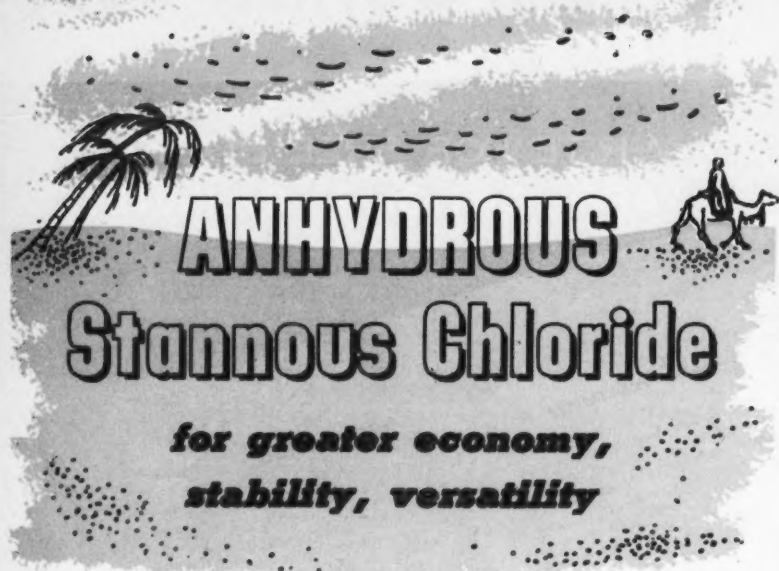
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Aircraft	Foundry Cores	Paint Packaging
Aluminum Chilling	Freeze Drying	Phenol
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Aspirin	Generator Purging	Polyester Fibers
Beverages	Grinding Coolant	Pulverization
Carbonates	Hog Slaughtering	Rubber Tumbling
Cooling of Reaction Kettles	T.I.G. Welding	Frozen Foods
Dining Car Refrigeration	Inerting	Shrink Fitting
Electronic Tubes	Instant Coffee	Sponge Rubber
Fire Prevention	Laboratory Use	Textile Manufacturing
Food Packaging	Leather Treating	Water Purification
	Steel Hardening	Water Treatment
	Paint and Varnish	White Lead

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ANHYDROUS Stannous Chloride

*for greater economy,
stability, versatility*

A highly powerful reducing agent in both non-aqueous and aqueous reactions, M&T Stannochlor (anhydrous stannous chloride) out-performs "tin crystals" in every known application—presents chemists with greater economy and wider versatility.

M&T Stannochlor serves as a tin plating chemical . . . intermediate for other tin chemicals . . . sensitizing agent for metallizing glass, plastics or metals . . . an antichlor . . . a stabilizer for soaps . . . and as an additive for lubricating and fuel oils. Other possible uses are as a catalyst in organic reactions, as an additive for well drilling muds, and as a powerful reducing agent.

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This unique chemical may favorably shape the future of your product or process. The exceptional stability and high purity of M&T Stannochlor assures consistent stannous tin content—even after extended periods of storage. Its anhydrous form offers distinct economy, adaptability and convenience advantages over hydrated stannous chloride.

For more information on M&T Stannochlor or any M&T chemical that interests you consult our Insert in Chemical Materials Catalog or write us for a copy of booklet C-57.

CHEMICAL MATERIALS

42) L-ARGININIUM-L-GLUTAMATE — 99%. Pharm additive, sodium-free flavor. Lower blood ammonia. General Mills.

43) ASBESTOL SUPERFINE — Foam rubber compounding pigment. Carbola.

44) ATLAS G-1564 — Tech. MP 51.1, esters, polyhydric alcohols. Textile lub, softener. Solid, stable. Atlas.

45) ATLAS G-3284 — Tech. Deriv polyoxyethylene sorbitol tallow. Textile lub, softener. Forms stable emuls. Atlas.

46) ATLOX 4525 — Non-ionic, anionic emuls for insecticides. Eff in sodium soft water. Atlas.

47) ATMOS 300 — Food grade ice cream emuls. Liquid mono and diglycerides of fat forming fatty acids. Atlas.

48) ATTAPULGITE — Attacote. Ag grade adsorbent, conditioning agent for ammonium nitrate. High water adsorption. Min & Chem.

49) ATTAPULGITE, ACTIVATED — Pharmsorb. Pharmaceutical grade internal adsorbent. High capacity. Min & Chem.

50) AVASOL 112P — 100%, 33% 1st. MP 45. Dye fixing, softening syn fibers, antistatic. Alframine.

51) 2,2'-AZO-BIS-ISOBUTYRONITRILE — Wt crys pwr. Mw 164.21. Blowing agent plastics. Sol acetone, alcohol, ether. Decom 100. Catalin.

52) BARIUM CHLORANILATE — Reagent. Det of sulfate in petroleum. Fisher.

53) BARIUM LANOLATE — PFC. Rust inhib paints. Int lubs, coatings. Ext hydrophobic. Chemactants.

54) BARIUM SOAP, SOL — Baralan L. Lubricants, grease compd. Dispers form of barium soap. Chemactants.

55) BARIUM-ZINC ORGANIC — "Dutch Boy" Temex 3. Heat, light, stabilizer for asbestos-filled vinyl flooring. Nat'l Lead.

56) BASE 8474 — Emulsifier for pesticides, herbicides in aromatic solvents. Drew.

57) BICYCLOHEPTADIENE — 95%. BP 89.5. Intermediate. Shell Chem.

58) BILIRUBIN — Pure. Meets Govt specs. Extinct Coeff 1.04 min. Reagent in liver function tests. Phanstiehl.

59) BIOPAL VRO-20 — Iodine-nonylphenoxypoly (ethyleneoxy) ethanol complex. Germicide. Antara.

60) BIS(CHLOROPROPYL) CHLOROPROPANE PHOSPHONATE — Tech. BP 110-5 at 0.1 mm. Fire-retardant additive, plasticizer. Hooker.

Mono Laurates Di

of
Diglycol

Ethylene Glycol

Diethylene Glycol

Polyethylene Glycol

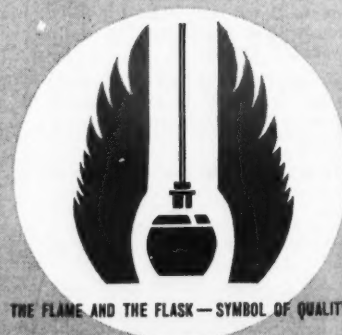
Propylene Glycol

Polyoxyethylene

Butoxyethyl

Glycerine

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CHEMICAL PROCESSING

CHEMICAL MATERIALS

61) **BIS(DIALKOXYPHOSPHINOTHIOYL)DISULFIDES** — 95-99%. Control insects, mites on fruit. Low tox mammals. Niagara FMC.

62) **BLANCOPHOR LS-81** — Optical whitener for paper. Antara.

63) **BORNYL ISO-VALERATE** — 98% ester. Min toxicity. Ingredient for flavors, perfumes. Oil of Valerian note. Fritzsche.

64) **BRITONE RED M CP-361** — Comm. Resinated barium lithol red, printing inks. Bleed resist. Sher-Will.

65) **t-BUTYL HYDROPEROXIDE** — 90%. Catalyst for vinyls, polyesters. Lucidol.

66) **n-BUTYL MERCAPTAN** — 98%. BP 93.5-102.0. Int ag chem, pharm. Pennsalt.

67) **BUTYLATED HYDROXYANISOLE** — Tenox MA, MT. 30% in solvent-emuls comb. Food grade antioxidants. Forms stable emuls applied to packaging matl. Eastman.

68) **BUTYLATED HYDROXY-TOLUENE** — Tenox BHT ag grade. Antioxidant for feeds. Free-flowing, easily handled. Eastman.

69) **CALCIUM CATALYST** — Advacar 4%. For emulsion paint systems. Compat latex, acrylics, alkyds etc. Advance Sol.

70) **CALODORANT F** — LP, natural gas odorizer. Oronite.

71) **CAPEYLYL PEROXIDE** — Lupersol MMO. 50% in mineral oil. Catalyst for vinyls. Lucidol.

72) **CARBOHYDRATE ACID ESTER OF LANOLIN ALCOHOLS** — Sucrolan. Emollient, gloss agent lipsticks, topical pharm. Am Cholesterol.

73) **C¹⁴-L-ISOLEUCINE** — Radiochem pure. Bio research. Schwarz.

74) **C¹⁴-L-LEUCINE** — Radiochem pure. Bio research. Schwarz.

75) **CARBON, ACTIVATED** — Catalyst support for vinyl monomer prod. Good pellet strength. UCC, Nat'l C.

76) **CARBON WOOL** — Activated or unactivated for adsorption, catalyst support, insulation, nuclear modifier. Barnebey-Cheney.

77) **CATION COLOR REAGENT DEVELOPERS** — Reagent. Dithioamide and trisodium pentacyanoamminoferrate. Metal chromatography. Fisher.

78) **CETYL DIMETHYL AMINE OXIDE** — Ammonyx CO. 20%. Wetting agent, oil emuls. Stable acid, alkali. Onyx.

NAMES AND ADDRESSES of manufacturers, page 93

DO THESE REACTIONS HAVE A PLACE IN YOUR WORK?

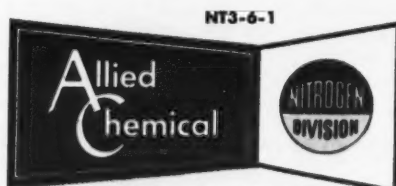
✓ NITRATION
✓ OXIDATION
✓ ADDITION TO CARBON-CARBON MULTIPLE BONDS
✓ REACTION WITH ALKALI METAL SALTS OF ORGANIC ACIDS TO FORM ACID ANHYDRIDES

NITROGEN TETROXIDE may be the practical, economical reactant you've been looking for. N_2O_4 has been getting around a lot among research people. It is being used as an oxidizing agent for chemicals and solvents. It has potential as an oxidizer for rocket fuels . . . as a route from olefinic hydrocarbons to nitroso-nitrate derivatives . . . as a component of liquid explosives. Perhaps it will open another door for you.

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Properties of Allied NITROGEN TETROXIDE

Molecular Weight	92.02
Boiling Point	21°C
Freezing Point	-11.3°C
Critical Temperature	158°C
Latent Heat of Vaporization	99 cal/gm @ 21°C
Critical Pressure	99 atm.
Specific Heat of Liquid	0.36 cal/gm—10 to 20°C
Density of Liquid	1.45 at 20°C
Density of Gas	3.3 gm/liter 21°C, 1 atm.
Vapor Pressure	2 atm. at 35°C



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Ethanolamines • Ethylene Oxide • Ethylene Glycols • Urea • Formaldehyde • U. F. Concentrate—85 • Anhydrous Ammonia • Ammonia Liquor • Ammonium Sulfate • Sodium Nitrate • Methanol • Nitrogen Solutions • Nitrogen Tetroxide • Fertilizers & Feed Supplements

Check 6501 opposite last page

SEE THE DIFFERENCE

DOW EPOXY RESIN
65% SOLIDS
in 50/50
MIBK/XYLENE

DOW SOLID

Y RESIN PROPERTIES

EPOXY RESIN TYPE
Epoxyd. Equiv. Wt.
Point (2)

D.E.R. 661	D.E.R. 664	D.E.R. 667
80-870	875-985	1400-2000
100°C.	95-103°C.	120-128°C.
	2 maximum	1 maximum
	1.183	1.180
	.14	.14
	<10	<10

COMPETITIVE EPOXY RESIN
65% SOLIDS
in 50/50
MIBK/XYLENE

For "clear" look at specification card, write to Dow.

"Pure" and "Clear" describe new Dow solid epoxy resins

The visibility test shown above vividly illustrates the clarity, purity and uniformity of Dow Epoxy Resin 667, one of three new solid epoxy resins developed by Dow.

The unique advantages of D. E. R.* 661, 664 and 667 are: (1) Nearly water-white color. (2) No need for filtering after cutting because these resins are free from salt and any small insoluble gel particles often found in standard solid epoxy resins. (3) Sodium content that is under 10 P.P.M. (4) And D. E. R. 661 is easier to handle and dissolve in solvents; it has a higher melting point so when flaked has

less tendency to fuse in warm weather.

These properties are possible because Dow is a basic producer of epoxy raw materials and is able to assure quality control and a narrower range of specifications. For more technical data on Dow Solid and Liquid Epoxy Resins contact your local Dow sales office or write THE DOW CHEMICAL COMPANY, Midland, Michigan, Coatings Sales Department 2255Q.

YOU CAN DEPEND ON



Check 6502 opposite last page

CHEMICAL MATERIALS

79) CETYL DIMETHYL ETHYL AMMONIUM BROMIDE — Ammonyx DME. 97% min. Disinfectant, deodorant, germicide, fungicide. Onyx.

80) CETYL TOSYLATE — Cetyl ester of p-toluenesulfonic acid 93%. Intro of cetyl groups. High reactivity. Fine Organics.

81) CHARCOAL, METALLURGICAL — Unactivated. Anti-oxidant for molten copper. Reduction. Precip of metals from soln. Barney-Cheney.

82) CHEM-ACRIL — Cationic surface active for dyeing Acrilan. Non-toxic. One bath process. Chemstrand.

83) CHEMIGUM N8 — Butadiene-acrylonitrile copolymer. Specification compounding oil-resistant applications. Goodyear.

84) CHEMNYLE — Tech cationic surface active. Dyeing filament nylon. Permits fastness. Chemstrand.

85) CHLOROFORM, ANHYDROUS — Reagent. Organic preps affected by moisture. 0.001% volatiles. Fisher.

86) CHLOROPHENYL SILICONE FLUID — 81717. Lub to 700°F. Hydraulic fluid. Silicone GE.

87) CIRKAL — Chlorinated alkaline detergent for dairies. Highly alkaline, non-foaming. Diamond.

DEVELOPMENTAL-SCALE materials listing starts page 79

88) COBALT CATALYST — Advacar 6% for emulsion paints. Compat latex, alkyds, acrylics, etc. Advance Sol.

89) COBALT EMULSIVE DRIER — 6% water emuls metallic salts of organic acids. Drying cat butadiene-styrene paints. Witco.

90) CONING OIL — Nopcone AR. Tech. Low-vis lub for bulk, stretch yarns. Static protec. Nopco.

91) COPPER-AMMONIA COMPLEX — Cronox C liquid conditioner for refinery crude. Removes O₂. Inhibits corrosion. Atlas.

92) CPA 1800 — Improve chrome plating solns. Diamond.

93) CYANOACRYLATE MONOMER — 910 Modified. Adhesive glass, rubber, metal, porcelain etc. Quick setting, strong. Eastman.

94) CYCLOHEXANONE PEROXIDE-DIBUTYL PHTHALATE — Luperco JDB-50T. Catalyst for vinyl, room-temp curing agent of polyester. Lucidol.

95) CYTIDINE-2-C¹⁴ — Radiochem pure. Bio research. Schwarz.

96) CYTIDYLIC ACID-2-C¹⁴ — Mixed isomers 2' & 3'. Radiochem pure. Bio research. Schwarz.

CHEMICAL PROCESSING

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

97) CYTOSINE-2-C¹⁴ — Radiochem pure. Bio research. Schwarz.

98) DAR-GLY — Hydrogenated tallow glyceride. 1% max unsaturation. Color and odor stable. Darling.

99) DAXAD 30 — Dispersing pigments in water systems. Clear, odorless, low foam. Dewey.

100) DECORALT — Resin base protective coating in colors. Wear, water resistance. Flintkote.

101) n-DECYL TOSYLATE — n-Decyl ester of p-toluenesulfonic acid 93%. Intro of n-decyl groups. Reactive. Fine Organics.

102) 2-DEOXY-D-RIBOSE — Cryst. MP 78-82. Sp rot [α]_D²⁰ = -55°. Bio, nutritional research. Sol water, clear soln. Schwarz.

103) DIALLYLAMINE — 98%. BP 110.4. Ag chemicals, resin int. Shell Chem.

104) 1,8-DIAMINO-p-METHANE — BP 107-126 at 10 mm. Curing agent for epoxies. Rohm.

105) 2,4-DIAMINO-6-PHENYL-TRIAZINE-1,3,5 — 99%. MP 224. For alcohol-aldehyde resins. Tenn Prod.

106) 1,3-DIAMINO PROPANE — BP 138 @ 735mm. Int resins, dyes, pharm, corr inhib, surface actives. UCCC.

107) DIBASIC OLEIC ACID — 80% di-, 20% tri-basic. Wilson-Martin.

108) DI-tert-BUTYL SULFIDE — Com 95%. BR 145-148; MP -11.5. Sp gr 20/4 0.8273. Solvent, chem int. Phillips Pet.

109) DICHLOROISOCYANURIC ACID — Com. MP 225. Dry solid for bleaches, washing compds. Low odor formation. Westvaco.

110) 2,4-DICHLOROPHENOXY-ACETIC ACID PROPYLENE GLYCOL BUTYL ETHER ESTERS — Esteron 99 Conc. Weed control. Easy to store, use. Dow.

111) DICYCLOPENTADIENE — 95%. Chem int, polymers, cat, pesticides. Velsicol.

112) DIETHANOLAMINE LAURYL SULFATE — Maprofix 2109. 75%. Shampoo conc, pigment dispersant. High conc. Onyx.

113) DI(2-ETHYLHEXYL)4,5-EPOXYCYCLOHEXANE-1,2-CARBOXYLATE — Epoxide 107. Iodine No. 2 max. 4% min epoxy. Plasticizer, stabilizer PVC. Fungus resist, light stable. UCCC.

114) O,O-DIETHYL PHOSPHOROCHLORIDOTHIOATE — 98% min. LD₅₀ 1.0 g/kg. Eye irritant. BP 96 @ 25mm. Ag chem int. Active acyl halogen. Borden.

115) DIGLYCOL CHLOROFORMATE — Com grade. BP 100 at 0.8 mm. Polymerizable monomer. Col-South.

116) DIMETHYLACETAMIDE — Tech. BP 165. Inert solvent. Arapahoe.

117) DIMETHYLFORMAMIDE — Reagent. Selective gas solvent for C₄ hydrocarbon streams. Fisher.

118) O,O-DIMETHYL PHOSPHOROCHLORIDOTHIOATE — 96% min. LD₅₀ 1.0 g/kg. Eye irritant. BP 57 @ 10mm. Int ag chem. Reactive acyl halogen. Borden.

119) DIMETHYL SULFIDE — 99+%. BP 37. Solvent, odorant, chelator. Low cost. Crown Zeller.

120) O,O-DIMETHYL O-(2,4,5-TRICHLOROPHENYL) PHOSPHOROTHIOATE — Trolene. Cattle grub control. Dow.

121) O,O-DIMETHYL O-2,4,5-TRICHLOROPHENYL PHOSPHOROTHIOATE — Korlan fly, roach killer. 6 wks residual action. Dow.

122) DINONYLPHENOL — Distilled. Solvent, wide intermediate application. Antara.

123) DIPENTENE MONOXIDE — 85%. Non-toxic. BP 113 @ 50mm. Epoxy diluent, phenolic mod. Int surface actives, perf. Becco FMC.

124) 2-DIPHENYLACETYL-1,3-INDANDIONE — 95%. High tox. MP 142-145. Rodenticide. Active in low conc. Niagara FMC.

125) DIPROPYLENE GLYCOL DIPELARGONATE — Tech. Emolein 2910. Base for syn fluid, greases. Pour pt -57. Low, high temp performance. Emery.

126) DIPROPYLENE TRIAMINE — 97%. Isomeric mixture. MP 209. Corr inhib, epoxy resin cat, pharm int. UCCC.

127) 1-DODECANOL — Cachalot lauryl alcohol. Max C₁₂. Titre 22. Prep high-foaming det, chem int. M. Michel.

128) DODECENE OXIDE — 90%. BP 156 @ 76mm. Diluent epoxies, mod phenolics, silicones. Int surface actives, perf. Low vis. Becco FMC.

129) DOWEX 50 W — High capacity cation exchange resin. Dow.

130) DRAPEX 7.7 — High solvating plasticizer for PVC. Resists staining. Argus.

131) DRUMULSE HL-4768 & HL-4798 — 100%. Fatty ester emulsifiers. Edible. Drew.

132) DRUMULSE 536R — Fatty ester emulsifier. Edible. Drew.

selective reducing agents, polymerization catalysts, anti-oxidants, stabilizing agents— THE AMINE-BORANES

Dimethylamine-Borane, (CH₃)₂NH:BH₃; Trimethylamine-Borane, (CH₃)₃N:BH₃; and Pyridine-Borane, C₅H₅N:BH₃, are useful for reduction of aldehydes and ketones, for stabilization against color formation, for preparation of Diborane, as polymerization catalysts, and as petroleum additives.

Perhaps other Amine-Boranes would interest you. We can prepare these from secondary and tertiary amines—many primary Amine-Boranes lose hydrogen at room temperature to form amino-boranes. Let us know which complexes you think might be of use to you. For further information on the Amine-Boranes, write for Technical Bulletin C-200.

Phone: F0rest 4-1130 TWX: Perryssville, Pa. 117

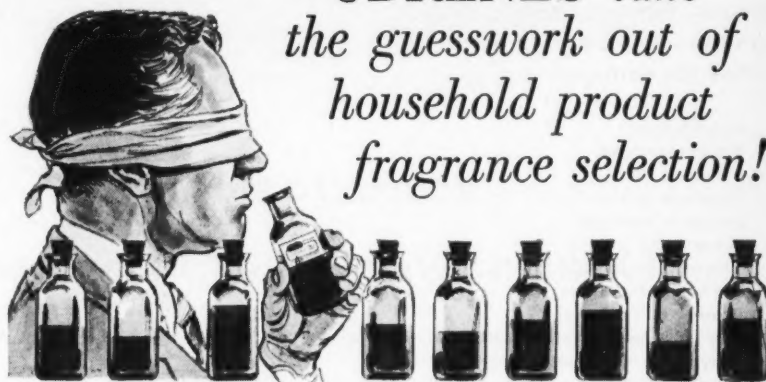


CHEMICAL COMPANY

PITTSBURGH 37, PENNSYLVANIA

Check 6503 opposite last page

ODRENES* take the guesswork out of household product fragrance selection!



When you use an ODRENE to scent your household product you can be sure of a competitive selling advantage. For every ODRENE is consumer-tested and accepted as a pleasing modern fragrance. You take no chances on its appeal!

You can also be sure of its technical performance in your product. For ODRENES are scientifically compounded to solve the unique problems of house-

hold products. They are versatile, easily adapted to the special requirements of your formulae, stable, and extremely economical to use.

May we demonstrate how these fragrances can solve your odor problem? Write for samples and the full cooperation of our technical staff.

*Odrene is the registered trade-mark for Sindar's series of fragrant additives.

SINDAR Corporation

Industrial Aromatics and Chemicals

321 West 44th Street • New York 36, N. Y.

Check 6504 opposite last page

The new Poly-Tergent J's (J-200, J-300, J-400, J-500) are nonionic surface active agents. They are pale yellow, have a slightly aromatic odor, and are offered as 85% aqueous solutions. They are used chiefly as detergents, dispersants, emulsifiers and wetting agents. Being aliphatic polyoxyethylene ether alcohols, they are chemically stable and highly effective under a wide range of acid or alkaline conditions.

Production is at Olin Mathieson's modern organic chemicals plant in Brandenburg, Kentucky. Local stock points are situated in key industrial cities. Poly-Tergent J surfactants are shipped in tank cars, tank trucks and 55-gallon drums. For processing economies in your operations, write today for samples.

Polyamines
Ethanolamines
Ethylene Oxide
Ethylene Glycol
Ethylene Diamine
Diethylene Glycol
Triethylene Glycol
Dichloroethylether
Ethylene Dichloride
Surfactants (Poly-Tergents)
Polyethylene Glycols (Poly-G's)
Glycol Ether Solvents (Poly-Solv's)

Poly-G, Poly-Solv and Poly-Tergent are registered trademarks



ORGANIC CHEMICALS

for
chemical
stability...

**Poly-Tergent
J
surfactants**

Check 6505 opposite last page

CHEMICAL MATERIALS

133) DUROXON H-120 — Emulsifiable Fischer-Tropsch hard wax. MP abt 95. Dura.

134) ELECTROSOL #400 — Non-ionic cycloamino compound. 100%. Liq. Permanently destatizes plastics. Alframine.

135) EL-TOX — Tech. Toxic. Organic, aliphatic tin compd. Slimicide air cond, cooling towers. Hampshire.

136) EMCOL C62-06C, C62-06D — Anionic, nonionic blend. Stable pentachlorophenol conc emuls. Emulsol.

137) EMCOL D34-5B — Alkanolamine salt of an alkyl aryl sulfonate. Base for liquid cleaners. High water sol. Emulsol.

138) EMCOL H-700, H-702 — Blend oil sol amine sulfonates, polyoxyethylene ethers. Matched pr herbicide conc emuls. Emulsol.

139) EMCOL H-900, H-902 — Blend oil sol Ca sulfonate, polyoxyethylene ethers. Matched pr insecticide conc emulsifiers. Wide range. Emulsol.

For easy reference as to specific use, check convenient "Use-Index" page 50

140) EMCOL H-C — Complex amine sulfonate with polyoxyethylene ethers. Emuls liquid pesticide fertilizer sprays. Emulsol.

141) EMCOL P-5900 — Sulfonate based anionic-nonionic blend. Emulsion degreasing. Excellent rinsing prop. Emulsol.

142) EMMI — 10% emuls conc. Fungicide small grains, glads. Toxicity 128 mg/kg. Velsicol.

143) EPOXIDIZED SOYA — Plastoflex ESO vinyl foam plasticizer-stabilizer. High epoxy cont. Sol esters, ketones, high alcohols. Advance Sol.

144) EPOXY — Maraset casting, carving resin 611 for patterns, models. Superior stability. Marblette.

145) EPOXY — D.E.R. 332. Low visc liq resin & vinyl stabilizer. High purity. Dow.

146) EPOXY — D.E.R. 661. Solid resin. MP 74-80. Dow.

147) EPOXY — D.E.R. 664. Solid resin. MP 95-103. Dow.

148) EPOXY — D.E.R. 667. Solid resin. MP 120-8. Dow.

149) EPOXY — Epon 1310. Solid resin. MP 176°F. High temp applications (500°F). Shell Chem.

150) EPOXY, CARVABLE — Maraset 611 for casting, splining. Dimensionally stable. Marblette.

151) EPOXY ESTER — Emulsion. Poly-Tex 611-B. Jones-Dabney.

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CHEMICAL PROCESSING

CHEMICAL MATERIALS

152) EPOXY RESIN, COATING — Maraset BV-790 clear, heat cured. Firm adhesion, dielectric strength. Marblette.

153) EPOXY RESIN, FLEXIBLE — Maraset 639 for casting, die facing, encapsulation. Stable, firm adhesion, odorless. Marblette.

154) ETHOXYLATED LANOLIN ALCOHOLS — Solulan 16. Emollient, solubilizer for O-in-W. Am Cholesterol.

155) ETHYLENE OXIDE POLYMER — Polyox, warp size grade. Cotton, worsted, synthetics. UCCC.

156) ETHYLENE OXIDE POLYMERS — Polyox water-sol resins WSR-35, 205, 301. MP 65-67. Paper coatings, det adhesives. UCCC.

157) FATTY ACID-AMINE COND — Monamid 7-100. 100% active liquid. Oil sol emulsifier, det. Cosmetics, cleaners. Mona.

158) FATTY AMIDE — Derrivative 938. Pigment wetting agent for alkyds. Prevents floating, flooding. Witco.

159) FLAVIN ADENINE DINUCLEOTIDE — 80-90%. Brt orange pwr. Sol water, phenol. Strong hygro. Bio research. Schwarz.

160) FLEXBOND 100 — Emulsion of vinyl acetate-vinyl stearate copolymer. Flexible, grease-resisting, heat-sealable film. Colton.

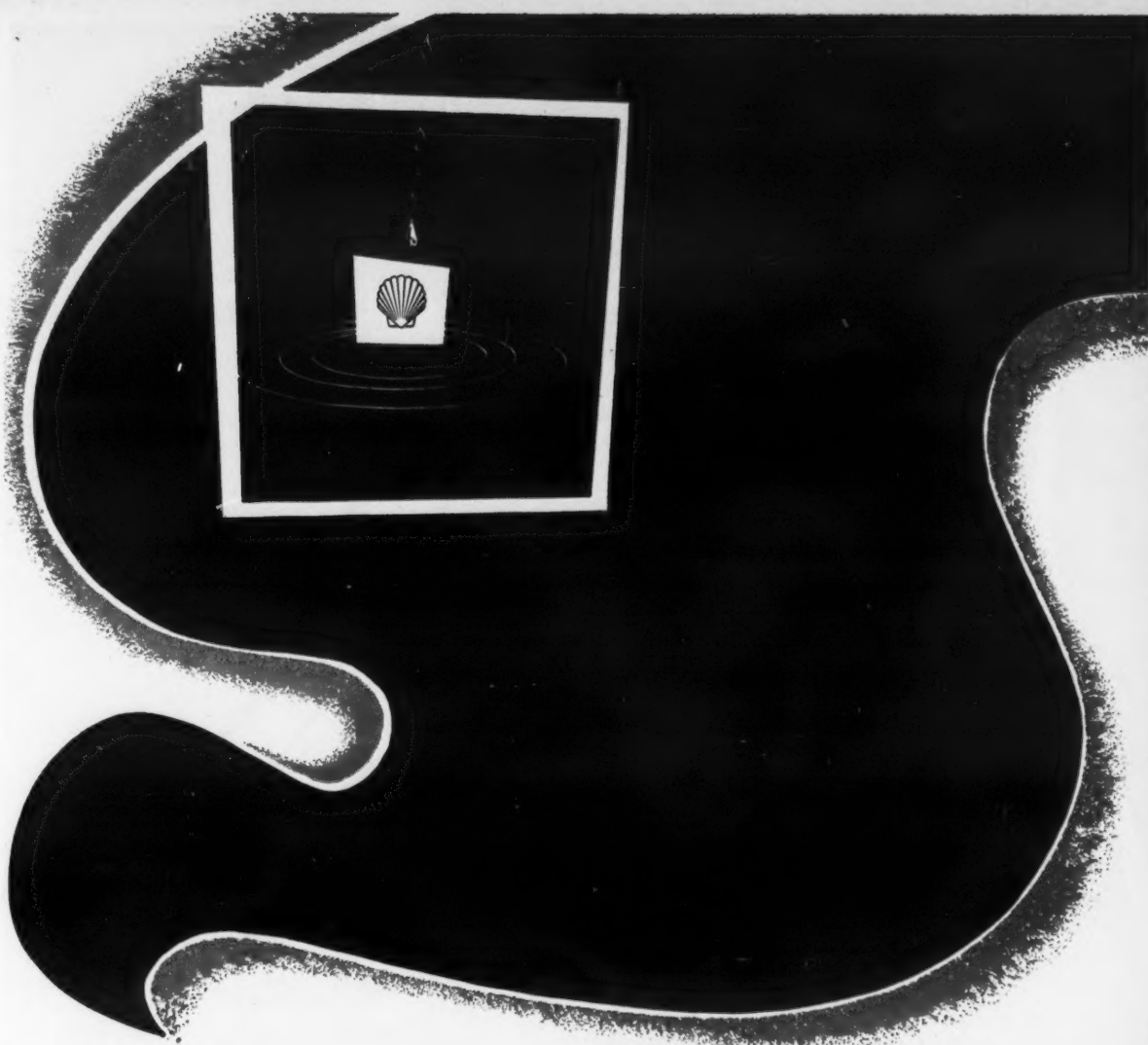
161) FLEXBOND 306 — Emulsion of vinyl acetate-acrylate copolymer. Pigment binder. Colton.

162) FLOCAID 1038 & 1063 — Starch-based flocculant for mining, metallurgical. Nat'l Starch.



"We finally developed a lining that would hold this stuff—but now the tank capacity is only five gallons."

Thanks to Ken Boyea, Hercules Powder Co., Holyoke, Mass.



EAK... higher solvency means better coatings at lower cost!

HIGH BOILING EAK... with its *high solvency* for nitrocellulose and most organic resins... is finding steadily increasing use in a variety of surface coating formulations.

Ethyl amyl ketone teams up with low-boiling MEK and medium-boiling MIBK to provide better flow and gloss and helps to eliminate dry overspray.

Also, EAK's slow evaporation rate helps minimize pinholing and bubbling in the film. It possesses superior blush resistance and good diluent tolerance.

EAK is also an important component of thinners for automotive, furniture and other lacquers. This high-boiler is also being used successfully in multi-color lacquers. Cellulose esters, vinyl polymers

and virtually all synthetic and natural resins are soluble in EAK.

And, EAK is now proving itself as a valuable intermediate in several industries.

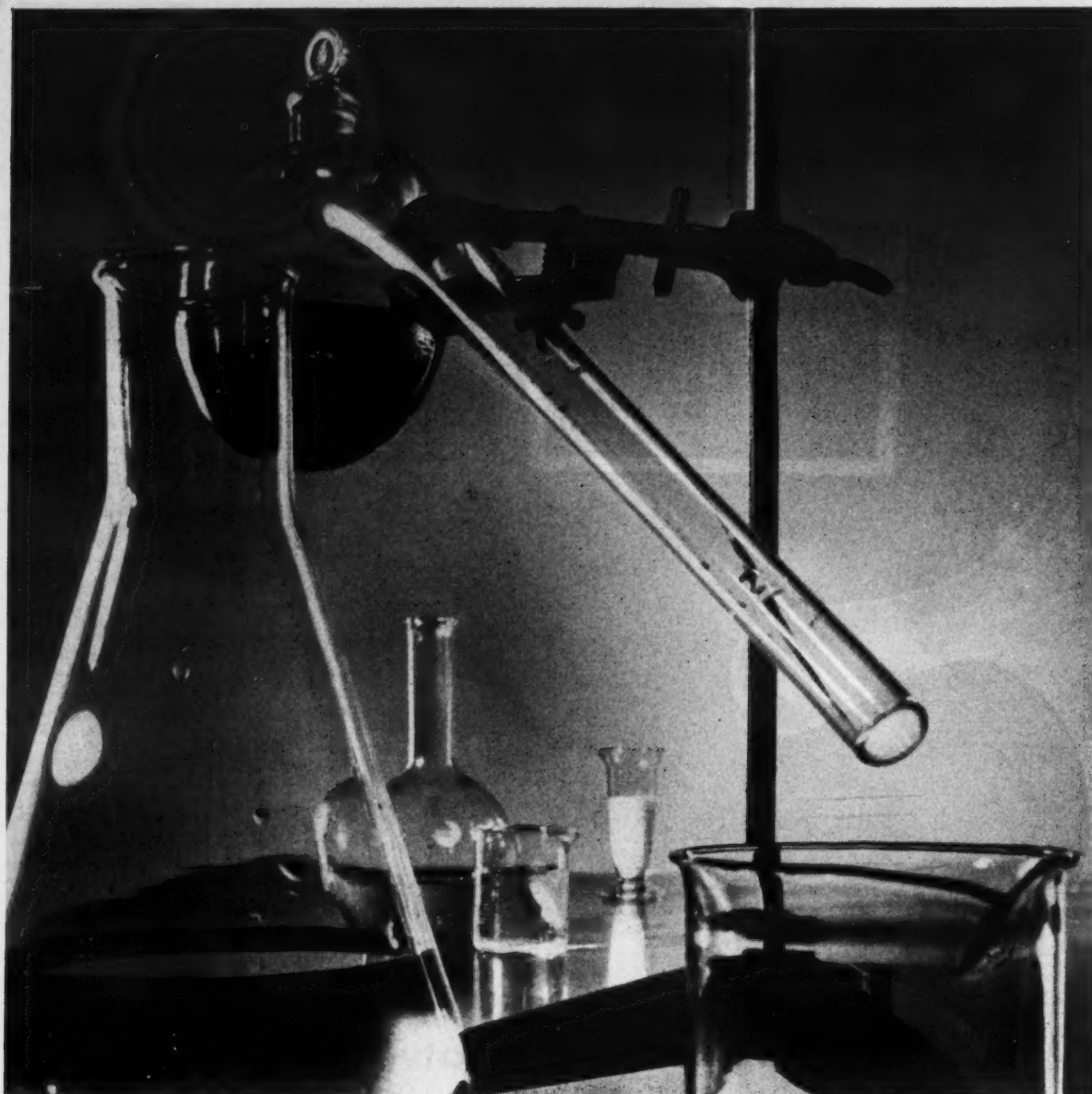
Your Shell Chemical representative will be glad to discuss your specific solvent needs with you. Write for ORGANIC CHEMICALS, a catalog of Shell solvents, resins and intermediates.

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Check 6506 opposite last page



Specialization means perfection

To do anything superlatively well, an individual or an organization must concentrate on that single endeavor. Our specialty is making petroleum sulfonates to fit specific requirements. We've been working at this specialty since 1925—when we became the first refiner to produce sulfonates.

If you are using or considering the use of a petroleum sulfonate, we believe this 33 years of specialized knowledge, combined with a willingness to suit our manufacture to your needs—will be of value to you. Why not call or write us and see? We may be able to make suggestions that will save you time, labor and money.

P.S. Even if you're not interested in sulfonates right now, you may want to read our new brochure on the subject. Send for your copy today.

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Specialists in
Petroleum Sulfonates



Check 6507 opposite last page

CHEMICAL MATERIALS

163) GALLIUM METAL — 99.999% Ga. MP 29.75; BP 1983. Prep of gallium arsenide, lubricant for high vacuum eqpmt. Alcoa.

164) GARLON — Diethylene glycol diester of dalapon plus propylene glycol butyl ester of silvex. Systemic herbicide. Dow.

165) GLUCOHEPTONIC ACID — Tech. 50% aqueous soln of α and β glucoheptonic acids. As ingredient in acid cleaners or manufacture of salts (injectable grade Ca glucoheptonate). Phanstiehl.

166) GLUCOSE 6-PHOSPHATE, SODIUM — Biochemical research. Schwarz.

167) L-GLUTAMINE — Chromat. Wt, cryst powder. Substrate for bio activity. Free-flowing. Schwarz.

168) γ -L-GLUTAMYL HYDRAZIDE — Bio, nutrition research. Schwarz.

169) GLYCERYL MONOSTEARATE — Cosmetic. Arlacel 165, MP 57. For creams, lotions. Acid stable, self-emuls, non-toxic, inert. Atlas.

170) GLYCOL DI-MERCAPTO-ACETATE — 95% min. BP 137-139 @ 1-2mm. Cross linker for unsat polymers. Evans.

DEVELOPMENTAL-SCALE materials listing starts page 79

171) GOLD BRONZE PASTES — Tarnish resistant. For pigmenting vinyl compounds. Claremont.

172) GRAPHIC RED M CP-1353 — Comm. Non-resinated barium lithol red, printing inks. Bleed resist. Sher-Will.

173) HARFEX 375 — Polymeric plasticizer. Low-temp flexibility. Harchem.

174) HEXACHLOROCYCLOPENTADIENE-1, 3 — 97%. BP 239. Chemical int. Hooker.

175) HYAMINE 2744 — Octylphenoxy-ethoxy-ethyl-dimethyl-p-chlorobenzyl ammonium chloride. Crystal. 97%. Germicide. Rohm.

176) HYAMINE 3500 — Alkyl dimethyl benzyl ammonium chloride. 50%. Germicide. Rohm.

177) HYDRO-BRITE — Blue-white fluorescent for paper, textiles. Water sol. Carlisle.

178) HYDROCARBON RESIN — X-37. Rubber cmpding, protective coatings. Color stable. Velsicol.

179) HYDROCARBON RESIN EMULS — W-617. Latex type coatings, rug backings. Velsicol.

180) HYDROGEN PEROXIDE, ANHYDROUS — 98%. Chem synthesis. Extreme purity. H_2O , conc. Becco FMC.

CHEMICAL PROCESSING

CHEMICAL MATERIALS

181) **N-HYDROXYETHYL PIPERAZINE** — BP 246.3. Int drugs, dyes, detergents, monomers. Three reactive groups. UCCC.

182) **HYDROXYPROPYLMETHYLCELLULOSE** — Methocel series. Water-soluble thickener, stabilizer, film forming, suspending agent. Dow.

183) **IGEPAL CO-990** — Pure. Dispersant. Antara.

184) **IGEPAL DJ-970** — Pure. Good detergency. Antara.

185) **IMINO-BIS-PROPYLAMINE** — BP 232; 113 @ 10mm. Int resins, dyes, pharm, surface actives. UCCC.

186) **INOSINE 5'-MONOPHOSPHATE** — Cryst sodium. Chromat. Wt cryst powder. Bio research. Sol water. Schwarz.

187) **INSULGRIP** — Adhesive, internally setting for cork, glass or polystyrene foam. Borden.

188) **IODINE-METHANOL SOLN** — Lab. Isolate surface film from Al alloys. Fisher.

189) **IODINE-METHANOL SULFOSALICYLIC ACID SOLN** — Lab. Isolate surface film from Al-Cu alloys. Fisher.

190) **IRON OXIDE** — Fe_2O_3 , CP. Prep of ferrites. Low alkali, silica content. Manganese.

191) **ISATOIC ANHYDRIDE** — 96%. MP 235-240. Prep of anthranilates, 4-hydroxyquinolines, o-amino thiobenzoates. Maumee.

192) **ISOBUTYL TOSYLATE** — Isobutyl ester of p-toluenesulfonic acid 93%. Intro of isobutyl group. Fine Organics.

193) **ISOPHTHALIC POLYESTER RESIN** — Dion-iso. High laminate strength, resistance to fatigue. Chem Process.

194) **ISOPROPYL CHLOROFORMATE** — Pure. BP 103. Int for plastics, pharmaceuticals, herbicides. Col-South.

195) **ISOPROPYL LANOLATE** — Skin emollient. Unusual penetration, protec. Am Cholesterol.

196) **ISOPROPYL PERCARBONATE** — MP 8. Free radical catalyst. Col-South.

197) **ISOPROPYL TOSYLATE** — Isopropyl ester of p-toluenesulfonic acid 93%. MP 14. Intro of isopropyl group. Fine Organics.

198) **KEL-F 820 RESIN LATEX** — Thermoplastic fluorocarbon resin copolymer. Blending agent protective coatings. Minn Mining.

199) **KELTHANE** — 1, 1-bis(chlorophenyl)-2, 2, 2-trichloroethanol. 18.5% active wettable powder. Miticide. Rohm.

200) **KENMIX P** — Cuttable paste. To carry curing agents into rubber mass. Easy to handle. Kenrich.

201) **LANOLIN ALCOHOL LINOLEATE** — Polylin. Emollient for skin and hair. Am Cholesterol.

202) **LANOLIN ALCOHOLS, EXTRACT** — LM 14. Nonionic surface active, emuls stabilizer, conditioner textiles. Chemactants.

203) **LANOLIN ALCOHOLS RICINOLEATE** — Ricilan B. Tenacious hydrophobic emollient for skin, hair. Am Cholesterol.

204) **LANOLIN, LIQUID FRAC** — Viscol AN. Emollient for skin, hair. Aerosols. Odor free, no wax comp. Am Cholesterol.

205) **LANOLIN OIL** — New Fluilan. 100% active ingredient for cosmetic emulsions. No odor. Soluble in mineral oil. Croda.

206) **LANOLIN STEROLS** — A5. Protec films on steel. Leather, fabric softener. Chemactants.

207) **LANOLIN, WAX FRACTION** — Waxolan. Emulsifier. Creams, lotions, polishes. Am Cholesterol.

208) **LATEX FILM STRIPPER** — Nopco G. Lessens adhesion of latex films for stripped coatings. Nopco.

NAMES AND ADDRESSES of manufacturers, page 93

209) **LAURYL DIMETHYL AMINE OXIDE** — Ammonyx AO. 20%. Wetting agent, oil emuls. Stable acid, alkali. Onyx.

210) **LAURYL TOSYLATE** — Lauryl ester of p-toluenesulfonic acid 93%. Intro of lauryl groups. Fine Organics.

211) **LEAD CATALYST** — Advacar 24% for emulsion paints. Compat latex, alkyds, acrylics, butadiene-styrene etc. Advance Sol.

212) **LEAD CHLOROPHTHALOSILICATE** — "Dutch Boy" Lectro 77. Heat stabilizer for PVC insulation, 60-80. Nat'l Lead.

213) **LEAD EMULSIVE DRIER** — 24%. Water emuls metallic salts of organic acids. Drying cat butadiene-styrene, alkyd paints. Witco.

214) **LEAD THIOSULFATE** — CP. Toxic. Mfg safety matches, therm repro systems. Ky Color & Chem.

215) **L-LYSINE** — 98% min. Peptide synthesis. General Mills.

216) **MANGANESE CATALYST** — Advacar 6% for emulsion paints. Compat latex, alkyds, acrylics, etc. Advance Sol.

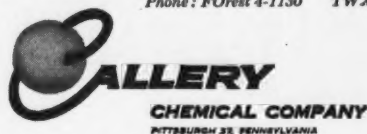
217) **MANGANESE EMULSIVE DRIER** — 6%. Water emuls metallic salts of organic acids. Drying cat butadiene-styrene, alkyd paints. Efficient. Witco.

... a mildly alkaline solid; intermediate, catalyst, corrosion inhibitor— SODIUM METHYL CARBONATE

Sodium Methyl Carbonate, $CH_3OCOONa$, is practically insoluble in many organic liquids, but is remarkably soluble in ethylene glycol and in glycerine. A relatively unknown and unexplored compound, it has an unusual combination of organic and inorganic properties.

Applications research on Sodium Methyl Carbonate continues at our laboratories. Some present and potential uses are: as an intermediate for preparing salicylates, ethylene carbonate, and benzyl carbonates; to neutralize weak acids; as a carbon dioxide source; to catalyze the alcoholysis of polyvinyl esters and glycerides; and to inhibit corrosion of anti-freeze cans. Write for Technical Bulletin C-910.

Phone: FOrest 4-1130 TWX: 117 Perryville, Pa.

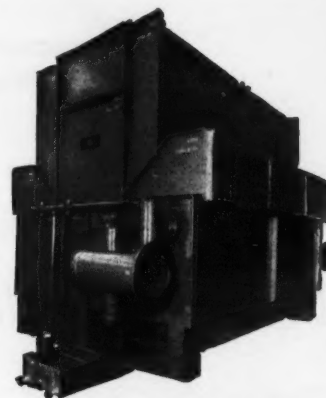


Check 6508 opposite last page

ECONOMICAL COOLING OF GASES AND COMPRESSED AIR

Cooling gases or cooling and removing moisture from compressed air, the Niagara Aero After Cooler offers the most economical and trustworthy method. Cooling by evaporation in a closed system, it brings the gas or compressed air to a point below the ambient temperature, effectively preventing further condensation of moisture in the air lines. It is a self-contained system, independent of any large cooling water supply, solving the problems of water supply and disposal.

Cooling-water savings and power-cost savings in operation return your



equipment costs in less than two years. New sectional design reduces the first cost, saves you much money in freight, installation labor and upkeep. Niagara Aero After Cooler systems have proven most successful in large plant power and process installations and in air and gas liquefaction applications.

Write for Descriptive Bulletin 130.

NIAGARA BLOWER COMPANY

Dept. CP-8, 405 Lexington Ave., New York 17, N.Y.

Niagara District Engineers in Principal Cities of U. S. and Canada

Check 6509 opposite last page

Another new development using

B.F. Goodrich Chemical raw materials



"Dish-Quick" all purpose spray and dishwasher made by Modern Faucet Mfg. Co., Los Angeles, California, uses hose made by Extruded Products Division, Stillman Rubber Company, Fullerton, California. Hose has synthetic rubber inner lining, nylon cord, and Geon polyvinyl jacket. B.F. Goodrich Chemical Company supplies the Geon polyvinyl materials only.

Geon jacket insulates faucet hose against kitchen corrosion

Who'd guess that a kitchen sink would be a tough place for rubber hose to perform? Experience proves that kitchen chemicals and grease will decompose a conventional rubber hose. The problem was solved with a jacket made from Geon polyvinyl materials.

Now the hose has excellent chemical, grease and abrasion resistance. There is less tendency to kink. And, thanks to versatile Geon, color can be built right in. Yet the heat resisting properties of rubber have been retained.

Here's another example of how you can open new markets or build a dramatic new or improved product with Geon polyvinyl materials. For more information, write Dept. LJ-8, B.F. Goodrich Chemical Company, 3135 Euclid Avenue, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.



GEON polyvinyl materials • HYCAR American rubber and latex
GOOD-RITE chemicals and plasticizers • Harmon colors

Check 6510 opposite last page



B. F. Goodrich Chemical Company
a division of The B. F. Goodrich Company

CHEMICAL MATERIALS

218) MARACARB X-1 — Mix lignosulfonates & sugar acid salts. Stabilizer for 2-4D amine concentrates. Marathon.

219) MARATAN N — Mod lignosulfonate. Leather tanning agent. Marathon.

220) β -MERCAPTOPROPIONIC ACID — 99% min. BP 110.5-111.5 @ 15mm. High purity. Evans.

221) 2-MERCAPTOTHIASOLINE 92.9%. AERO 2-MT. MP 104°. Anti-tarnish agent. Cyanamid, Ind Chem.

222) METHYLATED CARBAMIDE RESIN — Permafresh 424. Wash-and-wear finishes cotton, rayon. Low free formaldehyde. Warwick.

223) 2-METHYLBENZOIC ACID — 98%. Int alkyd resins, pharm. High purity, white. Cowles.

224) 3-METHYLBENZOIC ACID — 98%. Int insecticides, alkyd resins, pharm. Excel color, high purity. Cowles.

225) METHYL-t-BUTYL KETONE — Tech. BP 106. Pharmaceutical, pesticide int. Arapahoe.

226) METHYL ISOPROPYL KETONE — Tech. BP 94. Int for organics, pharmaceuticals, dyes. Aceto.

227) METHYL N-OCTADECYL TEREPHTHALAMATE — MP 110. Grease thickener. Oronite GA-10.

228) 2-METHYLPENTANOIC ACID — BP 196.4. Int lubs, plasticizers, alkyd resins, vinyl stabilizers. UCCC.

229) METHYL PHENYL FLUID — 81705. Heat transfer fluid, liquid dielectric. Stable to temp, oxidation. Silicone GE.

230) METHYL SILICONE FLUID — 81743. Low vis damping, hydraulic fluid. Silicone GE.

231) METHYL SILICONE FLUID — SF-96 (50). 50 centistoke additive to control cells in polyether foams. Silicone GE.

232) METHYL SILICONE FLUID — SF-97 elec grade. Dielectric for transformers, capacitors. Silicone GE.

233) MICRO VELVA L — Paint extender pigment for latex. Improves flow, hiding, washability. Carbola.

234) MINERAL OIL — Ramol 500, white. Exceeds USP. Catalyst, fuel carrier. Lubricant. Cent'l Oil.

235) MOD-EPOX — Organophosphorus compd. Diluent epoxy resins. Accel cure, reduce viscosity. Monsanto.

236) MOLYBDATE ORANGE FL-12-804 — Flushed in mixture of low, high mol wt polyethylene for vinyls, polyesters etc. Easily worked. Sher-Will.

GREENS

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and

2 Hydrated Chromium Oxides

Most stable of the green pigments. Unaffected by acids, alkalis, vehicles, and solvents. Non-fading.

The 4 pure chromium oxides will withstand ceramic temperatures. Use them in applications requiring permanency—enamels, emulsion paints, rubber, plastics, floor coverings, roofing granules, building materials, etc.

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EMERYVILLE, CAL.

CHEMICAL MATERIALS

237) MOLYBDENUM PENTACHLORIDE — Chlorination catalysts, lube additive int. Climax.

238) MONOALLYLAMINE — 98% BP 52.9. Monomer intermediate. Shell Chem.

239) MONO HYDRIC ESTER — 100%. Drew Ester 7150P. Non-oily spreader for cosmetics, pharmaceuticals. Plasticizer. Drew.

240) MONOPLEX S-73 and S-90 — Ester-type plasticizers for PVC, nitrocellulose, syn rubbers. Rohm.

241) MORPEL X-1095S — Tech. Na sulfonate of high mw alkyl benzene. Emulsifier, wetting agent, lube additive. Phizer.

242) MORPEL X-1099S — Tech. Na sulfonate of alkyl benzene (mw-440). Emulsifier, wetting agent. Phizer.

243) MUCOCHLORIC ACID — Wt crys powdr. Mw 169. MP 125-127. Int organics, color film. Catalin.

244) N-DURE — Urea-formaldehyde ammoniating soln for fertilizers. Allied, Nitrogen.

245) NIAX TRIOLS LG 56, 168 — Av mol wt 3000 & 1000. Starting urethane polymers flexible, semi-rigid. UCCC.

246) NIAX TRIOLS LHT — Polyol polyethers for urethane foams, alkyd resins. Improve compress-deflec curves. UCCC.

247) NICKEL-COBALT CHROMIA CATALYST — C36 selective hydrogenation acetylenes, propadienes etc. Long life. Cat & Chem.

248) NON-IONIC REAGENT — Lab. Analysis of water-soluble, non-ionic surface actives. Fisher.

249) t-NONYLAMINE — 90%. BP 160-174. Wide intermediate application. Rohm.

250) NOPCO DISPERSANT NO. 2 — Tech. Stable talc dispersion. Mold release rubber goods. Reduced cost. Nopco.

251) NOPCO NDW — Tech. Liquid antifoamer for emuls paints. 100% active. Nopco.

252) NORLIG MC — Mod ligno-sulfonate. Dispersant for gypsum stucco. Marathon.

253) NU-MET — Alkaline chlorinated detergent. Uniform white granl mix. Cleaning stainless in dairies. Diamond.

254) NUOSTABE V-14 — Ba-Zn compound. Heat, light stabilizer for vinyls. Nuodex.

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

We Sell Filtration NOT THE FILTER

At Shriver's we recommend the filter that's *right* for the specific processing conditions. This is done without prejudice or bias.

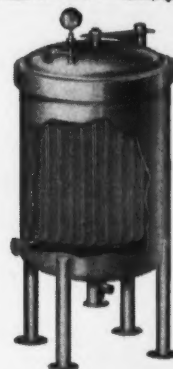
Of course, we design and manufacture an extensive line of pressure filters, suitable for a large majority of applications, but if our careful study of your filtration problem shows you need a vacuum filter or a pressure filter we do not manufacture, we tell you so frankly. Our aim: your satisfaction.

It's that simple, and has been paying off in customer goodwill for many years. We hope to continue meriting industry's confidence.

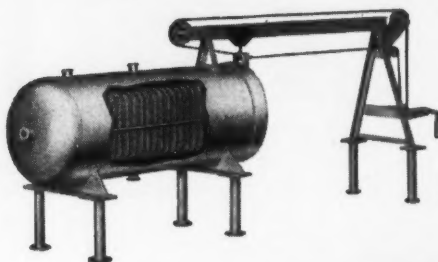
Literature on Shriver filtration equipment shown here will be gladly sent on request.



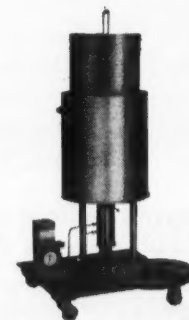
Plate and frame filter presses



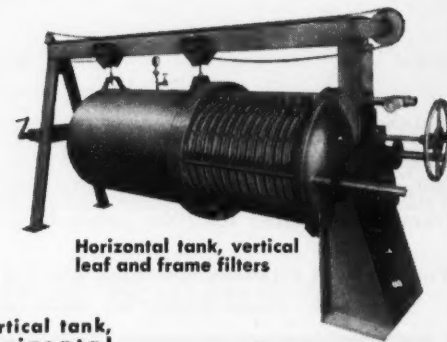
Vertical tank, vertical leaf filters



Horizontal tank, vertical leaf filters



Vertical tank, horizontal plate filters



Horizontal tank, vertical leaf and frame filters

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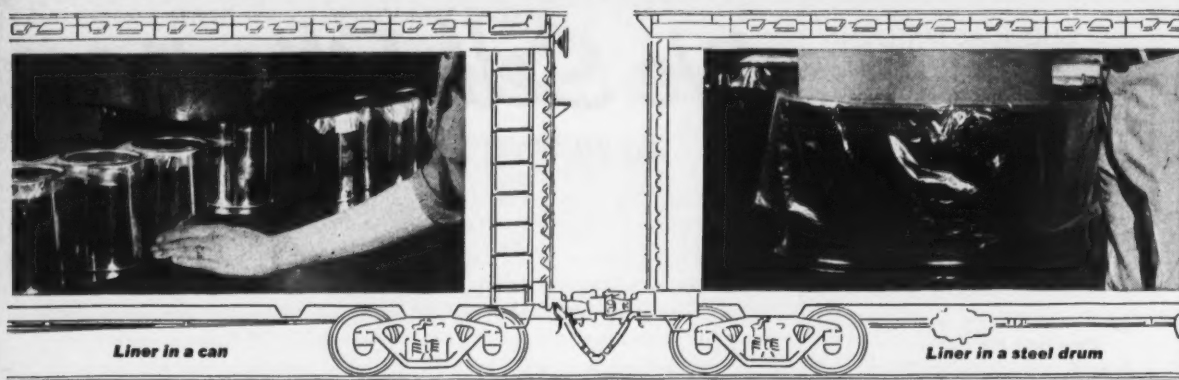
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Check 6511 opposite last page

AUGUST 1958

Check 6512 opposite last page

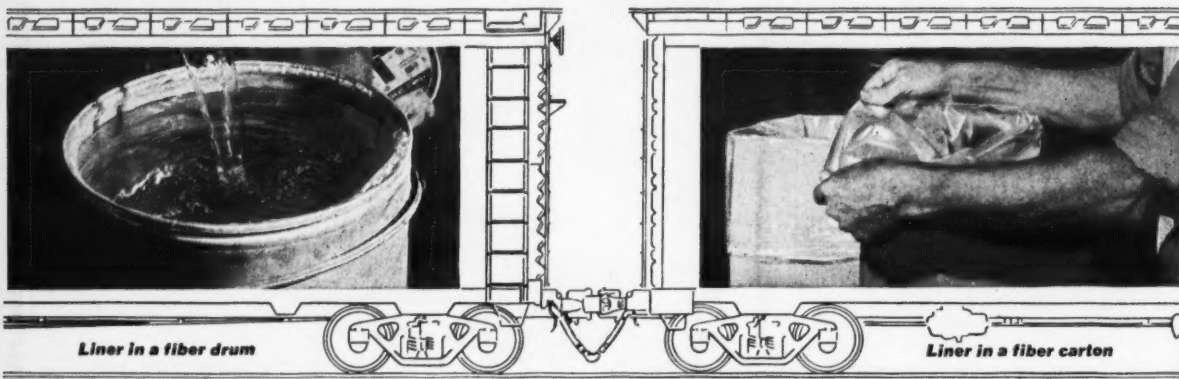


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TRADEMARK

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CHEMICAL MATERIALS

255) **NUOZENE PASTE** — Germicide for paints, plastics. Nuodex.

256) **NYLON RESIN** — Zytel 37X black molding powder. Wire jacketing. Heat and UV light stabilized. Du Pont.

257) **n-OCTADECENOL** — TGA. Titre: 8.5. Pharm, cosmetic vehicle. Int oil, fuel additives. Odorless, colorless, stable. M. Michel.

258) **OCTYLENE OXIDE** — 95%. BP 98 @ 110mm. Diluent epoxies, mod phenolics, silicones; stabilizer. Int. perfumes, surface actives. Low visc. Becco FMC.

259) **n-OCTYL MERCAPTAN** — 98.5%. BP 196.6-200.4. Int ag chem, pharm, surface actives. Pennsalt.

260) **n-OCTYL TOSYLATE** — n-octyl ester of p-toluenesulfonic acid 93%. Intro of n-octyl groups. High reactivity. Fine Organics.

261) **OLEFIN OXIDE C16-C18** — 90%. BP 169 @ 37mm. Epoxy diluent, phenolic mod, stabilizer. Int surface actives, Becco FMC.

262) **ORION RED CP-1300** — Met salt azo pigment. Comm. Yellowed for plastics, paints, inks. Excel heat resist. Sher-Will.

263) **OSPE** — "One shot" polyether-urethane foam catalyst. Eliminates preparation of prepolymer. Houdry.

264) **OXO-DECYL TOSYLATE** — Isodecyl ester of p-toluenesulfonic acid 93%. Intro of isodecyl groups. Reactive. Fine Organics.

265) **OXO-OCTYL TOSYLATE** — Isooctyl ester of p-toluenesulfonic acid 93%. Intro of isooctyl groups. Fine Organics.

266) **OXO-TRIDECYL TOSYLATE** — Isotridecyl ester of p-toluenesulfonic acid 93%. Intro of isotridecyl groups. Fine Organics.

267) **PALKENA A and W** — Fractionated, edible Palmkernel Stearine. High lauric content. MP 32-36. Base for suppositories. Dura.

268) **PARALAC 8** — Polymeric plasticizer, nitrocellulose lacquers. Retains flex, color, hardness. Baker.

269) **PARAPLEX G-54** — Polyester plasticizer for PVC, nitrocellulose, syn rubbers. Rohm.

270) **PEG 400 MONO LAURATE** — Tech. MP 5. Emulsifier, wetting agent natural, syn latex. Improves flow, leveling. Nopco.

271) **PENTAERYTHRITOL** — Tech. BP 185-245. Int alkyd resins, syn drying oils. Pelletized. Celanese.

272) **PERFLUOROCARBON RESIN** — Teflon 100X. Extrusion powder for hose, tubing, bottles. Inert. Heat resistant. Du Pont.

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Check 6513 opposite last page

THAT'S
INTERESTING



Sign language

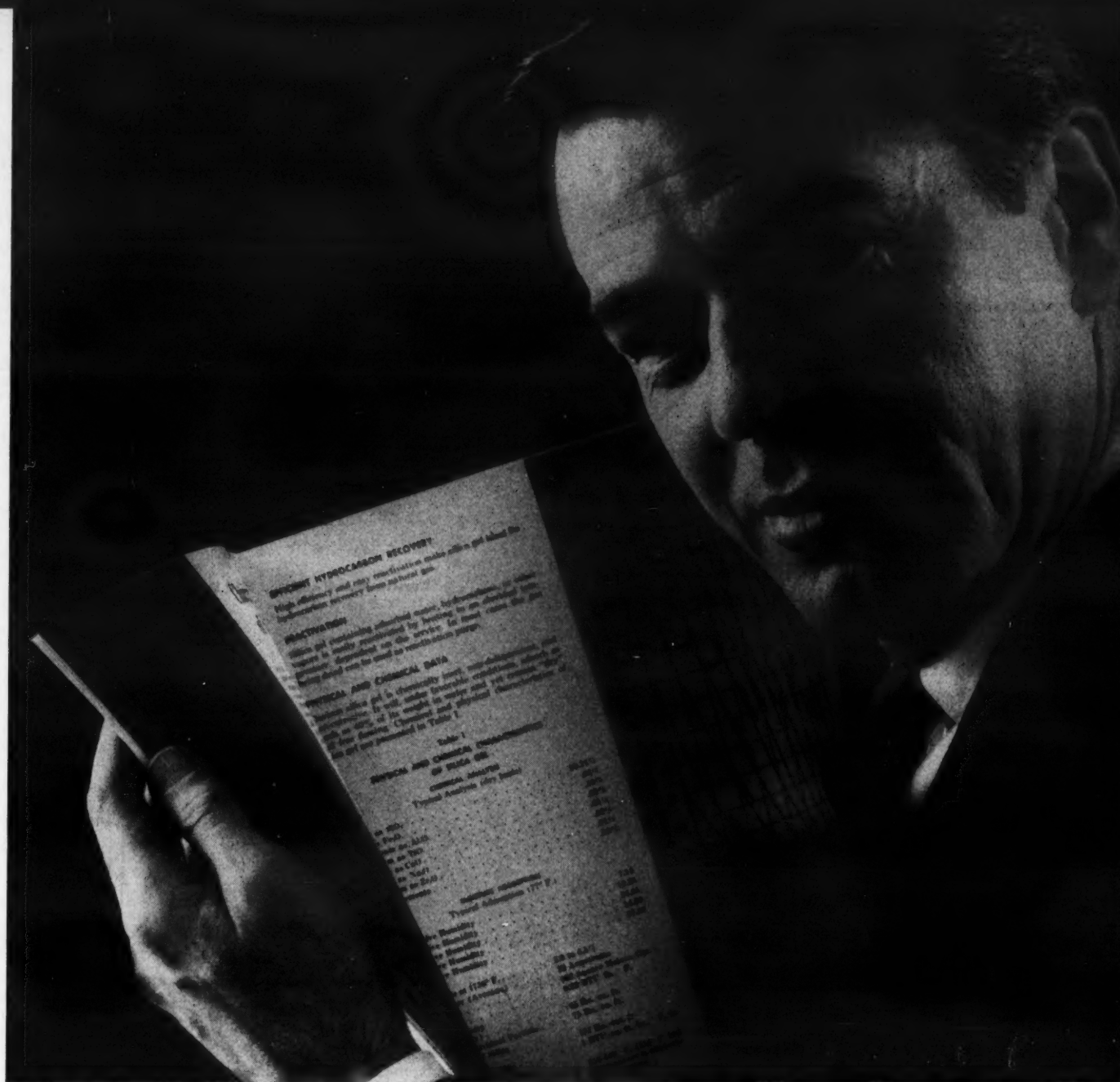
How does one say "This side up" in Belgian Congoese?

Great Lakes Carbon Corp. recently overcame this problem when the company shipped carbon electrodes to the Belgian Congo. To make sure the electrodes would arrive safely, the instruction label used universal language of pictures to get message across.

What time is it?

According to the Wakmann Watch Co., Inc. of NYC, their chronograph watch with the built-in slide rule performs calculations such as multiplication, division, ratios, exchange, conversion, interest, etc. Oh yes, it tells time too.

For more information on product at right, specify 6514 see information request blank opposite last page.



New from Davison... Technical Bulletin 202 on adsorption and dehydration with silica gel

If you have anything at all to do with air and gas dehydration, you'll want this 20-page, well-illustrated technical bulletin.

Here, in text and graph form, is a wealth of valuable, up-to-date technical data on: characteristics of silica gel; fundamentals of adsorption and dehydration; natural gas dehydration;

recovery of hydrocarbons from natural gas; compressed air dehydration; atmospheric dehumidification; dehydration of industrial gases; special types of silica gel; and other applications of silica gel. The data presented are based on reliable laboratory and field tests.

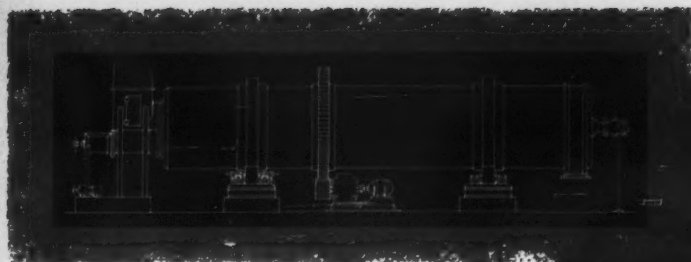
We're sure you'll find Technical



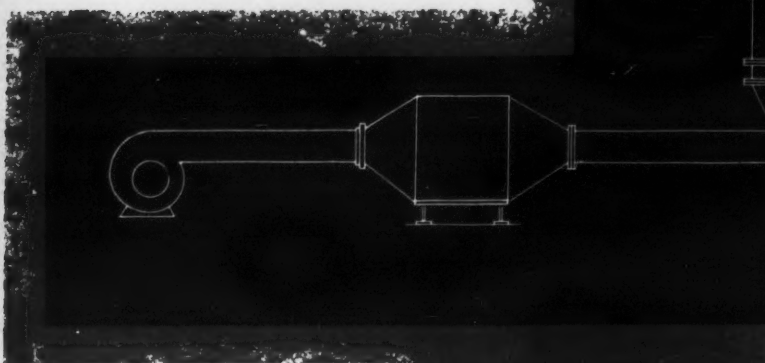
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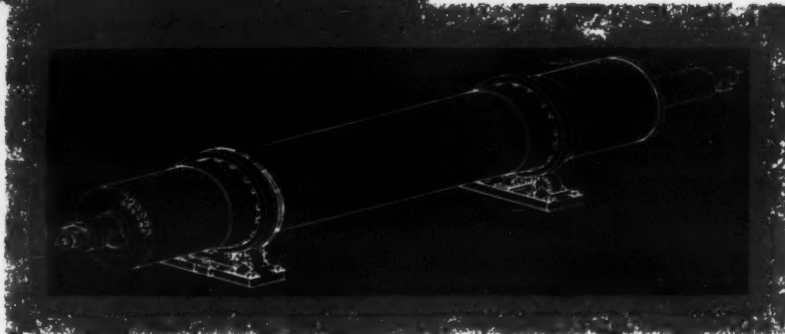


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Check 6515 opposite last page

CHEMICAL MATERIALS

From page 64

273) **PERMAFRESH 427** — Subcyclic nitrogen compd. Wash-and-wear finish knitted cotton, rayon. High Cl resist, durable. Warwick.

274) **PERMAFRESH LCR** — Subcyclic nitrogen compd for wash-and-wear finish cotton, rayon. Durable. Warwick.

275) **PERMAFRESH SOFTENER 355** — Complex fatty amide softener textiles. Minimum discolor. Warwick.

276) **PEROXIDOL 780** — Epoxidized soya bean oil. MPO. Cheaper plasticizer, stabilizer for vinyls. Reichhold.

277) **o-PHENYLPHENOL** — Tech. MP 56.0-57.5. Int for adhesives, disinfectants, textiles. Reichhold.

278) **PIGMENT SCARLET FL-10-805** — Flushed in mixture of low, high mol wt polyethylene for vinyls, polyesters etc. Easily worked. Sher-Will.

279) **α-PINENE OXIDE** — 90%. Non-tox. BP 85 @ 25mm. Epoxy dil, phenolic mod. Int perf. Low vis. Becco FMC.

280) **PLASTICIZER DP-312** — 100%. Ester-type, low temp for vinyls. Drew.

281) **PLASTICIZER DP-316** — 100%. Ester-type for vinyls, plastisols, organosols. Drew.

282) **PLASTICIZER DP-317** — 100%. Ester-type — monomeric in nature. For vinyls. Drew.

283) **PLASTOLEIN 9078** — Tech. Low temp plasticizer vinyls. Emery.

284) **POLYAMINE** — Aston 108, thermosetting. 20% active. Anti-static agent plastics, textiles, cosmet. Permanent. Onyx.

285) **POLYAMINE** — Modified. Epoxy curing agent — HN9816. Room temp curing. Furane.

286) **POLYAMINES, HETERO-CYCLIC MIXTURE** — Amine AL-1. BP 204-312. Epoxy curing agent. Int corr inhib, emuls, asphalt anti-strip agents. Jefferson.

287) **POLYESTER PREPOLYMER** — P-420. Tech liquid. Rigid urethane foams. High temp stable foams. Witco.

288) **POLYESTER RESIN** — Fomrez 50. Tech for urethane foams. Liquid. Witco.

289) **POLYESTER RESIN** — Fomrez 400. Tech liquid for rigid urethane foams. Heat stab. Witco.

290) **POLYETHYLENE** — Epolene C. Low mw. Melt casting, hot dip, hot melt coating paper. Applied direct. Eastman.

291) **POLYETHYLENE EMULS** — Permafresh Softener PE for textiles. No Cl retention; permanent. Warwick.

292) POLYETHYLENE GLYCOL DIMETHACRYLATE — Monomer MG-1. Dispersant for PVC resins. Improve scratch resist, gloss, hardness. UCCC.

293) POLYFLO-100 — Distillate-fuel dispersant, jet fuel additive. UOP.

294) POLYOXYPROPYLENE TRIOL — Resin grade. Polyurethane resins, lubricant. Wyandotte

295) POLYPROPYLENE GLYCOL — Resin grade. Polyurethane resins, lubricant. Wyandotte.

296) POLYSILOXANE FLUID — FP: -150°F. Dielectric fluid, low temp lube. Dow Corning 330 Fluid.

297) POLYSTYRENE, EXPANDABLE — Dylite F-40. Insulation, packaging, electronics. Controlled density, low K factor, closed cell. Koppers.

For easy reference as to specific use, check convenient "Use-Index" page 50

298) POLYURETHANE 101 — Vehicle for protective coatings. Resists abrasion, chemicals, solvents. Cargill.

299) POLYVINYL ACETATE EMULSION — D-700. Tech. Spray-dried. Int paints, patching cmpds, adhesives. Dry system. Shawinigan.

300) POLYVINYL ACETATE EMULSION — D-702 Tech. Dextrine compatible, spray-dried. Dry-mix adhesives. Shawinigan.

301) POLYVINYL CHLORIDE — Exon 4024, 4028, 4053, 4200. Rigid extrusion, molding cmpds. Impact strength, chem resist, good aging. Firestone Plastics.

302) POLYVINYL CHLORIDE — Exon 5205, plasticized. Elec insul, high temp. Chem, oil resist. Firestone Plastics.

303) POLYVINYL STEARATE — Kyrax A. MP 45-47. Synthetic wax for finishes. Air Reduc.

304) PROPYLAMINE — BP: -12 @ 50mm; 48.5. Prep corr inhib, emuls, dyes, pharm, insect. UCCC.

305) n-PROPYLISOCYANATE — 98%. Dangerous vapor. Pharm int. Carwin.

306) PYRAZOLONE RED — Plasticone Red Light 10465. Comm. Pigment in paints, inks, plastics. Sup light, heat resistance, opaque. Sher-Will.

307) L-PYROGLUTAMIC ACID — 98%. Glutamic acid subs. Does not produce nausea in large doses. General Mills.

308) L-PYRROLIDONE CARBOXYLIC ACID — Bio, nutrition research subs for glutamine acid. Schwarz.



What do you know about PYRIDINE?

1 Pyridine is a versatile material with many unique properties. As an acid acceptor it will not affect many fine chemicals often attacked by caustics. As a solvent, it produces cleaner separations and purer products. It is used regularly in the manufacture of penicillin, hormones, vitamins and waterproofing compounds, to name just a few.

2 As a basic and major producer of pyridine, Pittsburgh Coke and Chemical Company offers prompt, dependable deliveries in volume of quality-controlled materials in 2°, 10°, 15° and 20° grades.

3 In addition, Pittsburgh Coke offers you the benefits of its pyridine recovery service, which can reduce your pyridine costs up to 60% if your product volume has not permitted your own recovery of pyridine. • Whether or not you use pyridine now, we'll be glad to send you the full story on this interesting material. Write today!



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NAME _____			328	My foamer is
TITLE _____				
COMPANY _____				
CITY _____	ZONE _____	STATE _____		
Other _____				

Check 6517 opposite last page

CHEMICAL MATERIALS

309) QUATROIL — 90%. Hydrocarbon soluble fungicide. Fine Organics.

310) RC POLYMERIC BGA — Poly-adipate. MP -10. Plasticizer in PVC. Low migration, Compatible. Rubber Corp.

311) RESINS, CATIONIC — Warcofix 403. Improve wash fastness of dyestuffs. Low cost, efficient. Warwick.

312) RESINS, HYDROPHOBIC — Warcopel 393 water repel finish rayon, synthetics. Resin compat, easy to use. Warwick.

313) RESINS, HYDROPHOBIC — Warcopel C water repel finish on cotton. Resin compat, easy to use. Warwick.

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

314) RHOPLEX AC-55 — Acrylic emulsion, 55% solids for paint formulations. Rohm.

315) RHOPLEX B-74 and D-70 — Alkali redispersible acrylic emulsion polymers. Waxes, ceramic int. Rohm.

316) RHOPLEX B-86 — Emulsion of acrylic polymer externally modified with volatile plasticizer. Rohm.

317) RHOTEX A-9 — Aqueous paste, 50% solids. Softener, lubricant for textiles. Rohm.

318) 9-D-RIBOFURANOSYLX-ANTHINE — Chromat. Decom on heat. Wt cryst powder. Bio research. Sol hot water, alcohol. Insol organic solvents. Schwarz.

319) ROSIN AMINE PETRONATE — 50% rosin amine petroleum sulfonate. Rust preventive light hydrocarbons. Ashless. Sonneborn.

320) SEBACIC ACID ESTER — 2-SL. Synthetic lubricant base. Stable high temp. Harchem.

321) SEGLENE POWDER — Dry form of sodium glucoheptonates and aldobionates as chelating agent. For dry compounding. Phanstiehl.

322) SEGLENE 700D — 70% soln of glucoheptonates and aldobionates as chelating agent for alkali cleaning, de-rusting. BP 120. Phanstiehl.

323) SILANE — A-172 Glass Finish. Improves bond strength between glass cloth and polyester laminate. Sil Div, UCC.

324) SILANE — A-1100 Glass Finish. Improves bond strength between glass and laminating resin. Sil Div, UCC.

325) SILICA, HYDRATED — Zeolox 7A pesticide carrier. High abs, suspension. Huber.

326) SILICON DIOXIDE — 99.0-99.7% Coating thickener, pigment, dispersant; rubber reinforcing, insul. High purity, fine. Cabot.

327) SILICONE — Oil (dimethyl polymer). Pure. Dielectric fluid. Sil Div, UCC L-45.

328) SILICONE — 30% soln in xylene. Release agent for papers, plastic films. Dow Corning 23.

329) SILICONE — Creates hammered-finish effects in enamels, lacquers. Dow Corning F-4290.

330) SILICONE — Low mw intermediate for silicone-organic protective coating resins. Dow Corning F-6018.

331) SILICONE ADHESIVE — Bonds silicone rubber to metals, laminating. Dow Corning A-4000.

332) SILICONE ANTIFOAMS — Food grade based on alkyl polysiloxanes. Non-toxic. Forms stable stock soln. Hodag.

333) SILICONE EMULSION — Additive to polyurethane foams. Dow Corning EF-4527.

334) SILICONE EMULSION — Water dilutable. Release coating for papers. Dow Corning 22.

335) SILICONE EMULSION — 30% solids. Textile softener. Sil Div, UCC.

336) SILICONE EMULSION — Formasil 45. 35% solids. Lube, release on glass-forming machinery. Sil Div, UCC.

337) SILICONE EMULSION — 35% solids. Mold release, lubricant. Compatible with organics. Sil Div, UCC XLE-420.

338) SILICONE FLUID — Dimethyl silicone fluids modified by rust inhibitor. Dow Corning F-15A.

339) SILICONE GUM — Reinforced. Mfr high strength cmpds. Silicone GE.

340) SILICONE POLYMER SOLN — 81750. Solvent soln gives release qualities to paper. Silicones GE.

341) SILICONE RESIN — SR-155. Dipping, impregnating varnish. Silicone GE.

342) SILICONE RESIN — 81754 for heat-resistant coatings. Silicone GE.

343) SILICONE RESIN — Pure. Electrical applications. Sil Div, UCC XR-70.

344) SILICONE RESIN — 65% solids. For high-temp paint formulations. Sil Div, UCC R-64.

345) SILICONE RESIN — Thermosetting. 65% solids. Coating Class H electrical components. Sil Div, UCC R-610.

CHEMICAL MATERIALS

- 346) **SILICONE RESIN** — 65% solids. For laminating. Sil Div, UCC R-640.
- 347) **SILICONE RUBBER** — Silastic RTV 501. Fluid consistency compound. Dow Corning.
- 348) **SILICONE RUBBER** — Silastic 916. High strength at 500°F. Dow Corning.
- 349) **SILICONE RUBBER** — Silastic S-2096U, S-2097U and S-2098. Molding compounds vary in durometer hardness. Dow Corning.
- 350) **SILICONE RUBBER** — RTV-20 pourable paste, 250-400 poises. Potting, sealing. Room temp cures to 25-30 durometer. Silicones GE.
- 351) **SILICONE RUBBER** — RTV-60, 90. Room temp cure. Takes temp to 316. Silicone GE.
- 352) **SILICONE RUBBER CMPDS** — High strength. SE-362, 60 durometer; 372, 70 durometer; 382, 80 durometer. Silicone GE.
- 353) **SILICONE RUBBER** — SE-546. Mfr firm, closed-cell sponge usable —84.4 to 260. Silicone GE.
- 354) **SILICONE RUBBER** — SE-547. Mfr of sponge, closed cell. Used —84.4 to 260. Silicone GE.
- 355) **SILICONE RUBBER** — SE-555 for sealing, molding, extruding. Tough. Silicone GE.
- 356) **SILICONE RUBBER** — SE-701. Cloth, glass coating. Resists temp to 315. Silicone GE.
- 357) **SILICONE RUBBER** — SE-975. Elec grade. Extruded wire insul. Silicone GE.
- 358) **SILICONE RUBBER** — Shore hardness A — 85. Sil Div, UCC XK-1039.

**NAMES AND ADDRESSES of
manufacturers, page 93**

- 359) **SILICONE RUBBER** — Needs no pre-warming on mill prior to use. Sil Div, UCC XK-1056 & 1057.
- 360) **SILICONE RUBBER PASTE** — Silastic Adhesive S-2200. Bonds silicone rubber. No solvent. Dow Corning.
- 361) **SODIUM ALUMINUM CHLORHYDROXY LACTATE COMPLEX** — Chloracel. Cosmetic. Non-tox ingred for anti-perspirant sticks. Reheis.
- 362) **SODIUM BISULFITE** — Reagent. Control of impurity-sensitive reactions. Fisher.
- 363) **SODIUM DICHOROISO-CYANURATE** — Com. MP 230-50. Dry solid for bleaches, detergent sanitizers. High solubility. Westvaco.

To page 71



"Another product safely shipped in Inland 'protection-eered' containers"

IT'S COME A LONG, LONG WAY...

The leather that is . . . Used to be, back in Calamity Jane's time, that leather goods and wearing apparel were mighty cumbersome. And colors were pretty much restricted to those endowed by the poor departed original four-legged owner.

Today, thanks in large part to products of the chemical industry, leather has taken its place as a versatile, "high fashion" material. Rohm & Haas Company, for example, a pioneer producer of leather chemicals, manufactures highly pigmented nitrocellulose

lacquers used in formulating flexible color coats for leather of various types.

Maintenance of the color uniformity and purity during shipment is important to tanners who use these finishes. That's why these lacquers are shipped in Inland pails with a special lining, tailor-made to protect the contents.

Do you have a product that requires special protection during shipment? If so, it will pay you to let Inland's packaging experts go to work on your problem. Write Bob Boecher, Dept. 335C.



*the right container, with the right lining for your product

INLAND STEEL CONTAINER COMPANY

member of the **INLAND** steel family

6532 South Menard Avenue, Chicago 38, Illinois

Plants: Chicago • Jersey City • New Orleans

Cleveland and Greenville, Ohio. Full line of steel and stainless steel shipping containers, including galvanized and heavy duty ICC drums.

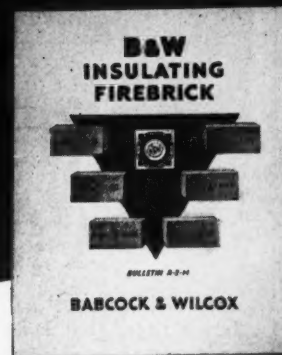


Check 6518 opposite last page

Why B&W IFB for Oil Heater Linings

?

- Lightest weight
- Simplified construction
- High hot load strength
- Lower conductivity
- Lower heat storage
- Better process control



The light weight of B&W Insulating Firebrick provides savings in capital investment in several different ways. The light weight of B&W IFB permits thinner wall constructions of equivalent insulating value. These thinner, lighter walls mean real savings in structural steel and concrete. Construction is further simplified because B&W IFB's high hot load strength makes possible higher unsupported walls without deformation at furnace operating temperatures. In addition B&W IFB can

be cut and shaped with ordinary wood working tools, simplifying field installation.

The light weight of B&W Insulating Firebrick also provides the greatest insulation. Thus, they save more fuel.

Light weight also means lower heat storage. B&W IFB protect you against burn-out of expensive alloy tubing in the event of forced shutdown. B&W IFB respond faster to changes in firing rate, too, assuring you of more positive process control.

**Write for Bulletin R-2-H giving more data on B&W Insulating Firebrick.*

B&W REFRACTORIES PRODUCTS:

B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick
B&W Insulating Firebrick • B&W Refractory Castables, Plastics and
Mortars • B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool



PROBLEMS?

Interested in solving them? Want to learn new ways of improving your plant operation and, thereby, realize savings?

In each...

issue of CHEMICAL PROCESSING there are articles that will help you solve many of your operational problems.

These "New Solution" stories appear in the "New Solutions" section which begins on page 114 of this issue.

This type of story is featured in other sections throughout the magazine.

They are case history stories that state the operating problem, explain how it was solved, and describe the results obtained.

"New Solution" stories cover all important phases of your operations — processing, safety, maintenance, material handling, packaging, corrosion, to name a few. This issue may contain the answer you need.

For more information on product at left, specify 6519 see information request blank opposite last page.



From page 69

364) **SODIUM FORMATE** — Reagent. Precip of noble metals. Aid in dyeing, printing fabrics. Fisher.

365) **SODIUM LAURYL SULFATE** — Maprofix 563. 99%. Cosmet ingred. Neg free alcohol, NaCl cont. Onyx.

366) **SODIUM SILICATE** — Versilad, formulated-modified. Adhesive for boxboard. Odorless aq slurry. Diamond.

367) **SODIUM SILICO ALUMINATE** — Zeolox 77 printing ink extender pigment. Fast drying, stable. Huber.

368) **SODIUM TETRAPHENYLBORON** — Reagent. Det of K, analgesics, alkaloids, nitro cmpds. Fisher.

369) **SOLULAN 97, 98** — Ethoxylated, acetylated ester-ethers of lanolin alcohols, hydroxy esters. Emullient. Water sol. Am Cholesterol.

370) **SP-1045 RESIN** — Curing butyl rubber. Schenectady.

371) **SP-126 RESIN** — With nitrile, neoprene rubbers for adhesives. Heat resist. Schenectady.

372) **STARCH ACETATE** — Ko-Films. Wide visc range. Paper coating, sizing. Nat'l Starch.

373) **STAT-EZE** — Non-soiling anti-static agent for textiles. Fine Organics.

374) **STERILON A** — Antiseptic coating for objects handled by public but seldom washed. Applied by dipping, spraying, brushing. White.

375) **STERILON B** — Antiseptic vinyl resin. High degree of activity. Calendaring, injection molding flexible items. White.

376) **STERILON C** — Antiseptic plasticizer for compounding with many paints, cellulose, vinyls, acrylates, shellac, nylons. Imparts antiseptic action to polymer. White.

377) **STEARYL DIMETHYLBENZYL AMMONIUM CHLORIDE** — Ammonyx 4002. 97% min. Creme rinses, conditioners. Onyx.

378) **STEARYL TOSYLATE** — Stearyl ester of p-toluenesulfonic acid, 93%. Intro of stearyl group. High reactivity. Fine Organics.

379) **STYRENE-BUTADIENE LATEX** — Exon XR-168. 50% solids. Water base primer. Metal adhesion. Fused at 163. Firestone.

380) **STYRENE-BUTADIENE LATEX** — Dylex KCD-66. Abrasion resist coatings for glass. Low cost. Koppers.

381) **STYRENE-BUTADIENE LATEX** — Exon XR-170. 48% solids. Air dry film former. Resists alkali salts. Firestone.



Add Carboxyl Groups to your Copolymer Chains
... by copolymerization with

METHACRYLIC ACID

The addition of carboxyl groups to your copolymer chains—even in small proportions—may provide one or more of such advantages as:

- Improved adhesion.
- Emulsion stability—both mechanical and freeze-thaw resistance.
- Solubility in alkalies, including ammonia.
- Reactive, cross-linkable groups which permit vulcanization with such agents as zinc oxide, diamines or epoxides.
- Improved oil resistance.

Rohm & Haas methacrylic acid provides a most convenient and economical way of introducing carboxyl groups by copolymerization with monomers like styrene, acrylonitrile, butadiene, acrylates and methacrylates.

Glacial methacrylic acid, readily available from full-scale commercial production, is one of 18 acrylic monomers obtainable from Rohm & Haas. Write to Department SP for complete information on glacial methacrylic acid and the other acrylic monomers.

Chemicals for Industry

**ROHM & HAAS
COMPANY**

WASHINGTON SQUARE, PHILADELPHIA 5, PA.

Representatives in principal foreign countries

Check 6520 opposite last page

Trapping Standardization

... steam trap standardization plus standardized hook-ups spell lower maintenance costs

An important weapon in the fight against rising maintenance costs is standardization. It can reduce the variety of maintenance problems and simplify those which remain.

Since we specialize in steam traps we'd like to offer some suggestions for a trapping standardization program. Such a program involves standardization on one make of trap and standardization of hook-ups.

Trap Standardization

The advantages of standardizing on a single make of trap are important and can make a big difference in the cost and ease of repairs because—

1. You can carry a more complete stock of repair parts with a smaller inventory.
2. Maintenance personnel has the opportunity to become expert on one make rather than be "jacks of all traps."
3. As an exclusive user of one make of traps you become a preferred customer of your trap representative and can be sure of getting the best possible service.
4. You can enjoy the advantages of standardized hook-ups.

Standardized Hook-ups

Standardized hook-ups facilitate and reduce the cost of both original installation and maintenance. By adopting standards for the dimensions of all fittings, including nipples, each hook-up for a given size of trap is identical and can be fabricated in the pipe shop.

Unions should be used so that when a trap needs repair, the unions can be uncoupled, the trap lifted from the line and a spare carrying identical length nipples and half unions slipped into place. In as little as a minute or two a faulty trap can be replaced. The faulty trap can go back to the storeroom for repair when convenient and then be put into stock as a spare.

Figure 1 shows a typical standardized hook-up used by a major chemical manufacturer. Note how

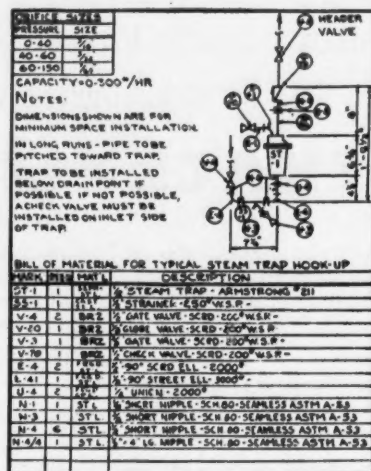


Fig. 1—Typical standardized installation hook-up used by a leading chemical manufacturer.

the hook-up provides the following advantages:

1. Test valve in trap cap permits fast, easy checking of trap operation.
2. Strainer ahead of trap protects it against dirt and scale.
3. Blowdown valve in strainer provides easy cleaning.
4. Check valve in discharge line isolates trap when test valve is opened.
5. Shut-off valves and unions



Fig. 2—Armstrong traps have only two moving parts—the lever assembly and the bucket. Nothing much to go wrong here.

ahead of and following trap permit removal of entire trap from line.

Another important consideration for getting the most from a standardization program is accessibility of the traps. Insofar as is possible, traps should be located so that they are convenient for inspection. The easier it is to locate and get at a trap, the less likelihood that it will be overlooked.

What Make of Trap? (This is the Commercial)


Obviously, a trap standardization program shows the best results when the make of trap selected is the one that gives the best service. Naturally, we think the make should be Armstrong and fortunately a lot of trap users agree. Here are some of the advantages of standardizing on Armstrong that have been pointed out by these users:

1. *Armstrong traps work.* They don't leak steam and they do discharge condensate and air as fast as they reach the trap. And they work with any return system.
2. *Armstrong traps aren't "prima donnas."* They need no special care or coddling. Valve and seat are hardened chrome steel. Lever assembly and bucket are stainless steel and these are the only moving parts.
3. *Armstrong traps aren't "orphans."* You can *always* get parts and service from nearby Factory Representatives and stocking distributors.

4. *Armstrong traps are guaranteed.* If you're not *completely* satisfied you can return the traps for refund of purchase price.

More Information

The 44-page Steam Trap Book (free on request) gives a lot more facts on trap selection and installation. Call your local Armstrong Representative or write **Armstrong Machine Works, 8808 Maple St., Three Rivers, Michigan.**



ARMSTRONG STEAM TRAPS

CHEMICAL MATERIALS

- 382) **SULFILM 140, 180** — Lubricant additives. Sulfurized sperm oil. Low pour pt, low viscosity. Sol. Carlisle.
- 383) **SUL-FON-ATE BL EXTRA** — Aq soln sodium salt of sulfonated aliphatic hydrocarbon. Wet-ting agent. Tennessee.
- 384) **SUSPENSOIL** — Highly sili-cated detergent. Dustless powder, Rapid sol. Diamond.
- 385) **SYL-GARD 17** — Silicone treatment for glass bottles. Dow Corning.

For easy reference as to specific use, check convenient "Use-Index" page 50

- 386) **SYN-O-TOL AV-60** — 100%. Stabilized alkanolamide. Surfactant, thickener, stabilizer. Drew.
- 387) **SYN-O-TOL AV-80 & AV-90** — 100% active lauric diethanolamide. With lauryl sulfates, forms stable foams. Drew.
- 388) **SYNTERGENT 130-W** — Tech. Syn detergent for raw wool. Eliminates alkali, improves carding. Nopco.
- 389) **TERGITOL NONIONIC NP-44** — Alky phenol ether of polyethylene glycol 100%. High temp emuls. High water sol. UCCC.
- 390) **p-TERTIARY BUTYLPHENOL** — 97%. BP 236-238. Int oil-sol phenolic resins, insect, odorants, demuls. UCCC.
- 391) **TETRABASIC LEAD FUMARATE** — "Dutch Boy" Lectro 78. Heat, light stabilizer for high temp PVC. Nat'l Lead.
- 392) **TETRABROMOPHTHALIC ANHYDRIDE** — Tech. MP 279.5-280.5. Preparation of flame-retardant plastics, waxes. Michigan.
- 393) **2,4,5,4'-TETRACHLORODIPHENYL SULFONE** — Tedian. 95-98%. Mite control, fruits, veg. Non-tox mammals. Niagara FMC.
- 394) **n-TETRADECANOL** — Cachalot myristyl alcohol M-44. Tech. Titre 36. Non-toxic pharm, cosmetic vehicle. Prep quat ammonium cmpds. M Michel.
- 395) **O,O,O',O'-TETRAETHYLS,S'-METHYLENE-BIS-PHOSPHORODITHIOATE** — Ethion. 94-98%. Mite, insect control. Niagara FMC.

396) TETRAFLUOROETHYLENE RESIN — Teflon 41X. Aqueous dispersion 33-35%. Water-repellent coating. Reinforcing. Inert, heat resistant. Du Pont.

397) **TETRAHYDROTHIO-
PHENE** — BP 115.0-124.4. Ag
chem, pharm int. Pennsalt.

398) 2,2',4,4'-TETRAHYDROXY-BENZOPHENONE — UVINUL D-50. Stabilizer for clear lacquers, films, dyes, cosmetics. Antara.

399) TFE-PHENOLIC DISPERSION — Tetrafluoroethylene emuls in phenolic resin. Lub coating, rubber, plastics, heat sensitives. Cures 150. Acheson.

400) 2,2'-THIOBIS(4,6-DICHLOROPHENOL) — USP. MP 186-189. Bacteriostat soaps, cosmetics, pharm. Catalin.

401) 2,2'-THIOBIS(4-METHYL-6-TERTIARY BUTYL PHENOL) — MP 82-88. Antioxidant polyethylene, petroleum, rubber. Stands high temp. Catalin.

402) THIODAN — 92% broad spec insecticide, aphids. For food crops. Niagara FMC.

403) TRIALLYLAMINE — 98%. BP 149.5. Shell Chem.

404) TRIBUTYL PHOSPHINE (TBP) — 95% min. BP 244. Polymerization catalyst. Int for corrosion inhibitors. Westvaco.

405) TRI-n-BUTYL PHOSPHINE — 95% min. BR 1% 198, 5% 215, 97% 244. Fuel additive. Westvaco.

406) TRIBUTYL PHOSPHOROTRITHIOATE — Folex defoliant. Com 75% merphos. Acute oral tox, LD₅₀ 1272 mg/kg. For cotton, roses, ornament. Natural leaf fall. V-C Chem.

407) 2,2,3-TRICHLOROHEPTAFLUOROBUTANE — Halocarbon 437. Tech. BP 98. MP 4. Coolant, chem int. Non-hydrolyzing. Halocarbon.

408) 2,4,6-TRICHLOROPHENOL — Potassium salt, 50% water soln. Slimicide in pulp, paper. Diamond.

409) 2,4,5-TRICHLOROPHEN-OXY ACETIC ACID — Inverton 245, free acid. Invert emuls for brush control. Non-volatile. Dow.

410) 2,4,5-TRICHLOROPHE-NOXY ACETIC ACID, AMINE SALTS — Veon 245. Brush control. Non-volatile. Dow.

411) 2,4,5-TRICHLOROPHE-NOXY ACETIC ACID PROPYLENE GLYCOL BUTYL ETHER ESTERS — Reddon Conc, herbicide. Year round use. Dow.

412) 2-(2,4,5-TRICHLOROPHE-NOXY)ETHYL-2,2-DICHLOROPROPIONATE — Novon Conc. Non-selec herbicide. Easy to use. Dow.

413) TRICHLOROPHENYL MERCAPTAN — Tech. MP 70-100. Polymerization modifier, intermediate. Hooker.

414) 1,2,3-TRICHLOROPROPANE — 98.4%. BP 152.8-156.9. Solvent oil, greases. Chem int. UCCC.

415) TRICHLOROSILANE — Pure. Raw material for production of electronic-grade silcon. Sil Div, UCC.

416) TRIETHANOLAMINE LAURYL SULFATE — Maprofix TLS Conc. 75%. Shampoo conc, bubble bath. High conc. Onyx.

417) TRIETHYLENEDIAMINE — 99.9%. BP 173-4. Produces odorless, low-density polyurethane foam. Houdry.

418) TRIMETHOXYBOROXINE — TMB. Extinguish fires in reactive metals. Pour pt -30; BP 100-150. Callery.

419) TRIS(2,3-DIBROMOPROPYL) PHOSPHATE — Tech. Flame retardant in hydraulic fluids and certain plastics. Michigan.

420) TRITIATED ADENOSINE — Radio-chem pure. Half-life 12 1/2 yr. Exp cellular metab. High activity. Schwarz.

421) TRITIATED CYTIDINE — Radio-chem pure. Half-life 12 1/2 yr. Exp on RNA formation. High activity. Schwarz.

422) TRITIATED THYMIDINE — Radio-chem pure. Half-life 12 1/2 yr. Bio research, cell formation, genetics. High activity. Schwarz.

423) TRITON X-202 — Na salt of alkyl aryl polyether sulfonate. Stabilizer latex emulsions. Rohm.

424) TRYBEN 200 — Weed killer. Dimethylamine salt of trichlorobenzoic acid 24.8%. Low toxicity. Grasselli.

425) UBATOL — U2007. Mod polystyrene latex emulsion for waxes, coatings, paints. High gloss, water resistance. UBS Chem.

426) UBATOL — U3050. Mod ethylacrylate latex emulsion for waxes, coatings, paints. High gloss, water resistance. UBS Chem.

427) UFORMITE MM-57 — Melamine-formaldehyde resin 50% in butanol. Baking enamels. Rohm.

428) UNICOR-LHS — Corrosion inhibitor, anti-icer for gasoline. UOP.

... a spontaneously flammable liquid organoboron compound, useful as a catalytic polymerization agent for ethylenic-vinyl-acrylic monomers— TRIETHYLBORANE

Triethylborane, (C₂H₅)₃B, is a colorless liquid, miscible with most organic solvents. Available now in experimental quantities, Triethylborane is a Lewis acid and forms complexes with ammonia and amines.

Spontaneously flammable, its vapors ignite in oxygen at partial pressures below 1 mm. at 0°C. Suggested uses include: as a polymerization catalyst; as an igniter; as a jet fuel or fuel component because of its unusual combustion properties. Other alkyl boranes can be made. If you expect that a particular compound might interest you, we would like to hear from you. For more information on Triethylborane, write for Technical Bulletin C-310.



Phone: F0rest 4-1130 TWX: 117 Perryville, Pa.

CALLERY
CHEMICAL COMPANY
PITTSBURGH 37, PENNSYLVANIA

Check 6522 opposite last page

where there's a drying operation leading manufacturers * insist on DUSTEX COLLECTORS

DUSTEX miniature cyclone tubes, cast of white iron, provide an ultra-hard, cling-free, self-cleaning surface to assure maximum material recovery at a constant, high-speed rate.

DUSTEX patented design prevents condensation within the collector when inlet temperature is above the dew point. Handles temperatures up to 800°F. There are no filters to clog, no sludge to pump. It's virtually maintenance free!

LOW INSTALLATION COST and up to 99.8% efficiency make DUSTEX the perfect collector for spray dryer, rotary dryer or flash dryer processes.

*Name on request
Write today for this free bulletin on the new D-584 DUST COLLECTOR.

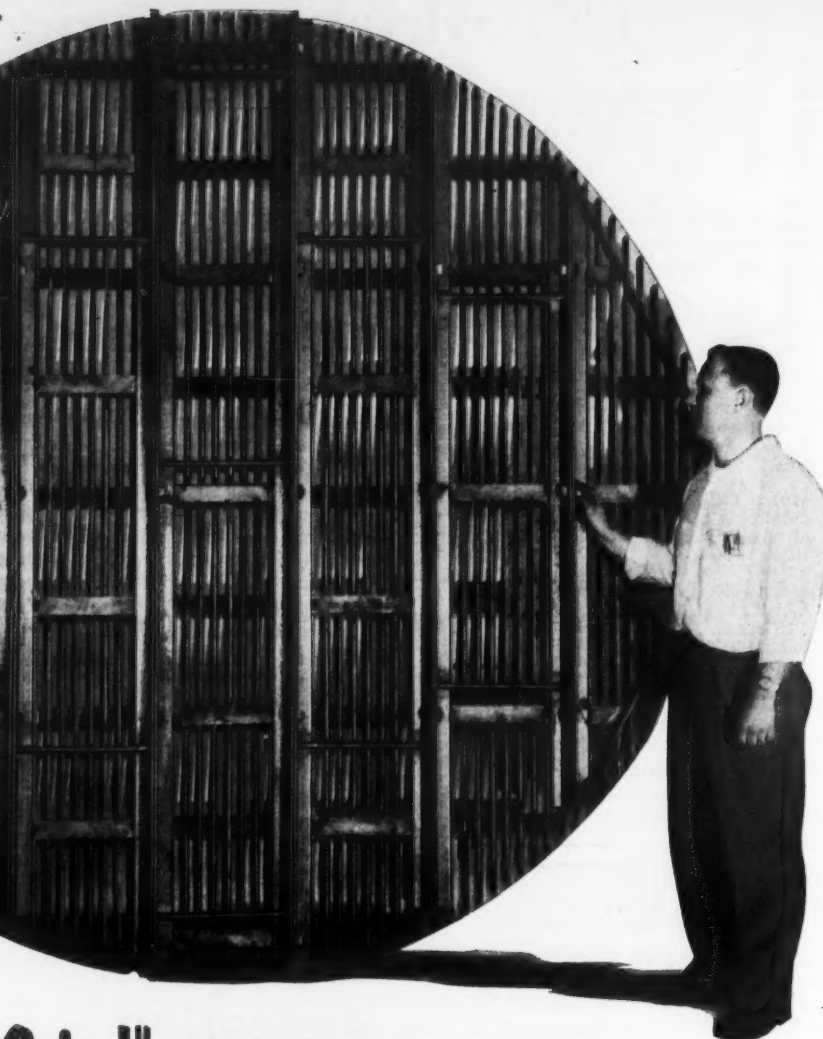


P.O. BOX 2520, BUFFALO 25, N. Y.

DUSTEX CORP.

Check 6523 opposite last page





A "Bump and Grind" Performance ... you can do without!

Even a hard-boiled chemical engineer can get a kick out of a good "bump and grind" performance on the stage. But when it happens in a tower it's a headache to all concerned.

Movement in a packed bed can be brought about by a number of things: a pulsating gas stream, vibration of the tower, or the tendency to operate a tower as close to the flooding limit as possible. Whatever the cause, unless some means is provided to confine the packed bed, the continuous "bump and grind" will destroy the packing.

U. S. Stoneware offers a simple solution to the problem: a floating "hold down" plate which rests on top of the packed bed and whose weight holds the packing in place. U. S. Stoneware hold down plates* are made to fit any size tower in a variety of weights ranging from 10 lbs. to 50 lbs. per square foot. They are available in ceramic, in mild steel, stainless steel or copper.

For full details on U. S. Stoneware's "hold down" plates, write for Bulletin HDF-36.


U. S. STONEWARE
 AKRON 9, OHIO

*Patent applied for

Check 6524 opposite last page

CHEMICAL MATERIALS

429) UOP NO. 5S — Gum inhibitor, tetraethyl lead stabilizer, catalyst for conversion of mercaptans in sour gasoline. UOP.

430) URACIL-2-C¹⁴ — Radiochem pure. Bio research. Schwarz.

431) URANIUM METAL — Reactor grade for alloys, fab of high-density fuel elements. Mallinckrodt.

432) URANIUM TETRAFLUORIDE — Reactor grade int for uranium metal. Easy to store, use. Mallinckrodt.

433) URANYL FLUORIDE — Reactor grade soln for EBWR. Water sol, variety of enrichments. Mallinckrodt.

434) URANYL NITRATE — Reactor grade. Ex reactor solns. Sol uranium source. Variety of enrich. Mallinckrodt.

435) URIDINE-2-C¹⁴ — Radiochem pure. Bio research. Schwarz.

436) URIDINE 5'-MONOPHOSPHATE, CRYSTALLINE DI-SODIUM — Chromat. Bio research. Schwarz.

DEVELOPMENTAL-SCALE materials listing starts page 79

437) URIDYLIC ACID-2-C¹⁴ — mixed isomers 2' & 3'. Radiochem pure. Bio research. Schwarz.

438) UVINUL DS-49 — Subs benzophenone. 67%. UV stabilizer for aq soln. Antara.

439) UVINUL MS-40 — 90%. UV stabilizer for aq soln. Antara.

440) VANCIDE 89RE — Recrystallized N-trichloromethylthiotetrahydrophthalimide. Non-toxic bactericide, fungicide. Vandblt.

441) VERSENEX 80 — Aq soln of diethylenetriamine-pentaacetic acid, pentasodium salt, tech. Chelating agent, textile processing. Dow.

442) VYN-EZE — Purified slip agent for vinyl extrusion. MP 59-100. Approved by FDA for contact with food. Fine Organics.

443) VINYL ACETATE — Paint, paper coating base, textile size. Imprvd emuls, reduced water sensitivity. Dewey.

444) VINYL ACETATE-ACRYLIC — Copolymer dispersion. Resyn 2400. Scuff-resistant coatings. Nat'l Starch.

445) VINYL-ACRYLIC — Copolymer latex. Non-woven binder (paper), leather finishing. Nat'l Starch.

446) VINYL CHLORIDE-VINYL ACETATE — Copolymer emulsion. Resyn 2507. Adhesive for PVC sheeting. Nat'l Starch.

215-F

U.S.I. CHEMICAL NEWS

★ A Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★

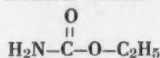
Urethan Applications Grow In Drug, Chemical Fields

Ethyl carbamate, more commonly known as Urethan, has become a useful chemical tool with a wide variety of uses since it was first produced in this country over 20 years ago. Urethan's applications now range from cancer therapy to the manufacture of plasticizers — and useful new reactions are continually being found.

In the pharmaceutical field, Urethan is now employed in the production of tranquilizers, and in the synthesis of many drugs. Its medical applications include the treatment of leukemia and other forms of cancer. Urethan is a mild hypnotic and sedative; is also reported to enhance the effectiveness of penicillin and streptomycin, and to increase the activity of certain enzymes.

Plasticizer producers use Urethan as a gelatinizing agent for cellulose acetate and cellulose nitrate. Cosmetic makers find it an excellent solvent in astringent preparations and hair dyes. Diazo paper manufacturers incorporate it into the light-sensitive layer to yield bright, stable prints.

Urethan is the ethyl ester of carbamic acid and has the chemical formula



As a chemical intermediate, it reacts with many organic and inorganic compounds to form end products or other intermediates of commercial importance in the dyestuffs, plasticizer, food and drug fields among others.

U.S.I., pioneer producer of Urethan, has a wealth of experience with this wide-spectrum chemical, and can supply information or technical help on applications and reactions.

Polyethylene Closures for Drums Now Self-Venting

Used on U.S.I. Alcohol Drums

A leak-proof, tamper-proof, all-polyethylene closure for containers carrying liquids—trade-named FlexSpout® — now has a self-venting feature which eliminates the need for other separate vents on shipping containers. The improved spout

* © Rieke Metal Products, Auburn, Ind.

MORE



Self Venting FlexSpout on U.S.I. Pure Ethyl Alcohol, USP, 5-gallon drum being pulled up into pouring position via new bail on reserl cap.

Promising New Sodium Treatment Developed for Bonding Teflon

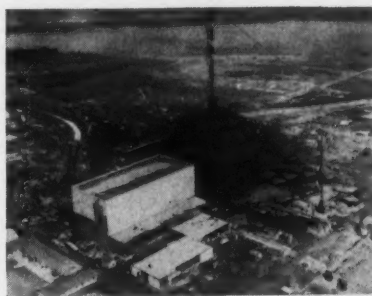
Sodium-Naphthalene-Solvent Treatment Claimed More Convenient Than Earlier Teflon Preparation for Strong Bonding to Metals, Rubber and Plastics

A new surface treatment has been developed for joining fluorinated resins such as Teflon to other materials. The resulting ease of bonding will undoubtedly increase Teflon utilization as a corrosion-resistant lining for process equipment and vessels, as a bearing material, and in fluid seals.

Largest All-Nuclear Power Plant to Contain 44 Miles Of Zirconium Tubing

At Dresden, Illinois, a 180,000 KW all-nuclear power station is being constructed which will contain in its reactor core almost 44 miles of tubing made from zirconium. This Commonwealth Edison boiling water reactor plant will be the largest all-nuclear station in the U.S. when it begins operation in mid-1960.

The tubing is made of reactor-grade Zircaloy-2 and is used as a container for UO₂ fuel pellets. It is to be given special pressure, sonic and corrosion tests, to insure that it



Sphere to house reactor, and turbine building, for Commonwealth Edison's Dresden, Ill., power plant — to be country's largest all-nuclear station when completed in 1960. Reactor will contain 44 miles of zirconium tubing. (photo courtesy General Electric)

meets the rigid tolerances established for this type of tubing.

Zirconium metal has an extremely low nuclear cross-section — allowing free passage of neutrons — and makes an ideal cladding material for uranium because it offers minimum interference to the fission process, is corrosion and heat resistant, and structurally strong.

This zirconium tubing order, the largest ever placed, is being processed by Mallory-Sharon Metals Corporation (owned 1/3 by U.S.I.), world's largest producer of special metals such as titanium, hafnium, zirconium, tantalum and columbium. The company uses a U.S.I. sodium reduction manufacturing process which offers advantages in both economy and product quality.

The new process, described in U.S. Patent 2,809,130, requires only conventional ventilation, and uses treating solutions that can be stored for long periods. Its advantages over the sodium-ammonia solution surface treatment should bring the new process into wide application for preparing Teflon for adhesion to metals, rubber and plastics.

Bond Strengths Are High

It is reported in the patent that peel tests were made on an epoxy cement bond between the treated Teflon and a phenol-formaldehyde resin — and that the bond was stronger than the Teflon itself. Similar results were obtained in joining Teflon to metal and rubber with a chlorinated rubber adhesive.

How It Is Done

The Teflon surface is bathed at room temperature with a sodium-naphthalene complex dissolved in a solvent such as dimethyl glycol ether. When the surface turns a grey-brown, it is ready for bonding to other materials. A wide variety of common adhesives can be used, including chlorinated rubber types, resorcinol formaldehyde cements, phenolic types, and epoxies.

Preparation of Treating Solutions

The patent gives a specific example of solution preparation as follows: a liter of a molar solution of naphthalene in a dimethyl glycol ether solvent

MORE

Another ISOSEBACIC® Acid Patent for U.S.I.

U.S. Patent No. 2,822,389 on the separation of C-10 dicarboxylic acids has been granted to U.S.I. It is the ninth patent U.S.I. has obtained on its manufacturing process for ISOSEBACIC acid — a new intermediate for the plastics industry. The material is a mixture of three C-10 dibasic acids — 2-ethylsuberic acid, and 2,5-diethyladipic acid, and sebacic acid.

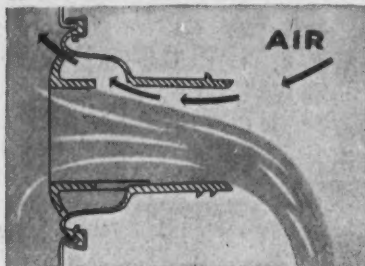
A plant to produce ISOSEBACIC acid in commercial quantity is now being completed at U.S.I.'s major chemical complex in Tuscola, Illinois. Potential applications of the new intermediate include the manufacture of plasticizers, ester lubricants, alkyds, polyamides, polyurethanes, reinforced plastics and in chemical synthesis.

U.S.I. CHEMICAL NEWS

CONTINUED

Polyethylene Closures

also eliminates liquid surge or "glug" in pouring. It is claimed that there is no waste or spillage, since the closure will vent in any pouring position, and a controlled flow—large or small—can be maintained. Patent has been applied for.



Cross-section of Self Venting FlexSpout closure.

The new FlexSpout, like the old, is normally recessed during shipping and storage and can be extended for pouring. Addition of a bail to the polyethylene cap, however, makes it easy to pull the spout up into pouring position.

This improved closure will soon be on all 5-gallon containers in which U.S.I. ethyl alcohol is shipped. It offers greater convenience in handling and pouring.

CONTINUED

Teflon

reacted with metallic sodium. Formation of the sodium-naphthalene complex is indicated by the appearance of a greenish color, at which point the Teflon is immersed.

Other investigators have cited the use of finely divided sodium dispersed in xylene or white oil. Preparation and handling are described in a U.S.I. brochure, "Sodium Dispersions" which may be obtained on request.

Those who will be employing metallic sodium for the first time when applying this treatment will find valuable information in U.S.I.'s 40-page book, "Handling Metallic Sodium on a Plant Scale." The book is available from U.S.I. without charge.

Cabot's Extrafine Silica Now Made at Tuscola, Ill.

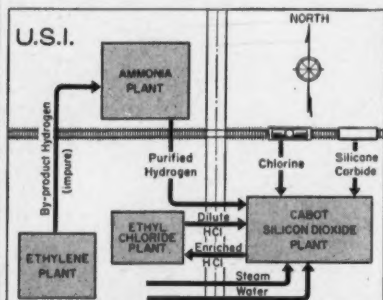
New Plant is Integrated with U.S.I. Production Facilities

A five million pound per year plant for the production of finely-divided silicon dioxide is now onstream at Tuscola, Illinois. Godfrey L. Cabot, Inc. has been importing the product, Cab-O-Sil®, from Germany since 1952. The new Cabot plant is the first in this country to make silica by the German process.

Cab-O-Sil's unique properties are said to derive from this method of manufacture which involves the vapor-phase hydrolysis of silicon tetrachloride in a hot hydrogen environment. The silicon dioxide produced has a particle diameter of 15-20 millimicrons, surface area of 175-200 square meters per gram, purity of 99.99.7%. It has found application in reinforcing rubber polymers, producing stable lubricating greases, coating reproduction papers, adjusting viscosity of paints and inks, and controlling flow properties of a wide variety of industrial powders and liquids.

Cabot chose Tuscola as a plant site because of its economic advantages. Located near U.S.I.'s ammonia and ethyl chloride facilities, the new Cabot plant utilizes raw materials supplied by the U.S.I. processing units, and the U.S.I. ethyl chloride plant uses byproduct hydrogen chloride from Cabot.

*© Godfrey L. Cabot, Inc.



Flowsheet showing interrelation of U.S.I. and Cabot plants at Tuscola, Illinois.

TECHNICAL DEVELOPMENTS

Information about manufacturers of these items may be obtained by writing U.S.I.

Glass acid bulbs for accurate quantitative analysis of fuming acids, toxic or volatile chemicals, etc., can now be purchased in commercial quantity. They are said to be of controlled diameter, weight, uniformity of wall thickness; can be made in any desired size. **No. 1370**

Portable kit for field testing of non-fat milk solids is now available. Permits quick determination of solids content before milk goes to dairy. Consists of portable water bath, milk sample tubes, lactometers; weighs 40 lbs. **No. 1371**

Antibacterial compound just developed is claimed nontoxic, nonirritating, noncorrosive, odorless, tasteless, water soluble. This complex silver compound is suggested for liquid soaps, toilet goods, other similar products. **No. 1372**

New pump eliminates contact of moving parts with fluid handled. Intake and outlet consists of one flexible tube passing through pump body and acted upon by kneading action of double rotor. Handles corrosives and abrasives. **No. 1373**

Molybdenum pentachloride—active catalyst for chlorinating aromatics, Friedel-Crafts alkylations and like reactions—can now be obtained in semiworks quantities. Also "plates" molybdenum when reduced by hydrogen. **No. 1374**

New needle-and-glass syringe combination packed in sterile polyethylene bag is now available. Entire unit is designed to be discarded after use. Glass barrel unaffected by solvents during long contact with parenteral fluids. **No. 1375**

All phases of the flexographic printing process are covered in a new, revised, updated edition of an older book. Now on sale, new volume includes sections on copy preparation and halftone printing by flexography. **No. 1376**

New centrifugal filming machine for sterilizing sensitive biological fluids and producing high-potency vaccines by ultraviolet irradiation now in production. Suggested for polio vaccines, blood plasma, liquid foods. **No. 1377**

Fiber glass finishing agent which establishes a better bond between fibers and resins is now available in semiworks quantity. Reported to give better wet and dry strengths to polyester, epoxy, melamine, phenolic laminates. **No. 1378**

For liquid oxygen systems, new thread sealing compound is now available. Is specifically formulated for negligible impact sensitivity, is claimed to have approval of several rocket motor manufacturers. **No. 1379**

PRODUCTS OF U.S.I.

HEAVY CHEMICALS

Sodium, Metallic: cast solid in tank cars, steel drums, pails; bricks in barrels, pails.

Sodium Peroxide, Sodium Sulfite, Sodium Sulfate

Ammonia, Anhydrous: commercial & refrigeration. Tank cars or tank wagons.

Ammonium Nitrate, Nitric Acid, Nitrogen Fertilizer Solutions

Phosphoric Fertilizer Solution: wet process phosphoric acid.

Sulfuric Acid: all strengths, 60 Baume to 40% Oleum. Also Electrolytic grade to Federal specifications. Tank cars or tank wagons.

Caustic Soda, Chlorine

OTHER PRODUCTS

PETROTHENE® Polyethylene Resins

Pharmaceutical Products: DL-Methionine, N-Acetyl-DL-Methionine, Urethan USP, Riboflavin USP, Intermediates.

Alcohols: Ethyl (pure and all denatured formulas); Proprietary Denatured Alcohol Solvents SOLOX®, FILMEX®, ANSOL® M, ANSOL® PR.

Organic Solvents and Intermediates: Normal Butyl Alcohol, Amyl Alcohol, Fuel Oil, Ethyl Acetate, Normal Butyl Acetate, Diethyl Carbonate, DIATOL®, Diethyl Oxalate, Ethyl Ether, Acetone, Acetoacetanilide, Acetoacet-Ortho-Chloranilide, Acetoacet-Ortho-Toluidide, Ethyl Acetoacetate, Ethyl Benzoylacetate, Ethyl Chloroacetate, Ethylene, Ethyl Sodium Oxalacetate, Sodium Ethylate, ISOSEBACIC® Acid, Sebacic Acid, Urethan U.S.P. (Ethyl Carbamate), Riboflavin U.S.P., Pelargonic Acid, and 2-Ethyl Heptanoic Acid.

Animal Feed Products: Antibiotic Feed Supplements, BHT Products (Antioxidant), Calcium Panthothenate, Choline Chloride, CURBAY B-G®, Special Liquid CURBAY, VACATONE®, Menadione (Vitamin K₃), DL-Methionine, MOREA® Premix, Nicotin USP, Riboflavin Products, Special Mixes, U.S.I. Permadry, Vitamin B₁₂ Feed Supplements, Vitamin D₃, Vitamin E Products, Vitamin E and BHT Products.

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U.S.I. INDUSTRIAL CHEMICALS CO.
Division of National Distillers and Chemical Corporation
99 Park Avenue, New York 16, N. Y.

CHEMICAL MATERIALS

447) VINYLIDENE CHLORIDE-ACRYLONITRILE — Copolymer. Soln coating plastics, papers. Dow.

448) VINYL LATEX — Exon 790. 50% solids. Roll coat, impreg fabric, paper. Fused at 163. Firestone.

449) VINYL LATEX — Exon XR-169. Internally plasticized 50% solids. Air dry film former, coatings. Firestone.

450) VINYLPIRROLIDONE-VINYL ACETATE — Copolymers, 50% soln in ethanol. Coatings, hair sprays. Antara.

451) VINYL STABILIZER — Advastab BC-100, liquid barium-cadium. Sp gr 25/25 0.950-0.970. Light stable. Advance Sol.

452) VINYL STABILIZER — Advastab Z-6 WW, liquid zinc compd. Control hydrogen sulfide staining. Co-stabilizer. Advance Sol.

For easy reference as to specific use, check convenient "Use-Index" page 50

453) WAX 275 — Fine beads. MP 135. Increases MP of wax-resin blends, asphalts. Resists solvents, acids, alkalis. Carlisle.

454) WING STAY T — Hindered phenol. Non-staining, non-discoloring rubber stabilizer, antioxidant. Goodyear.

455) WITCO 912 — Anionic-nonionic blend of polyoxyethylene esters of carboxylic acids, oil-sol sulfonates. Emuls, pigment in latex paints. Efficient. Witco.

456) WOOL WAX ALCOHOLS — Lanethyl. MP 64. 100% active plasticizer for PVP hair sprays. Soluble SDA alcohol. Croda.

457) W.R.D.A. — Reduces water content in concrete 20%. Dewey.

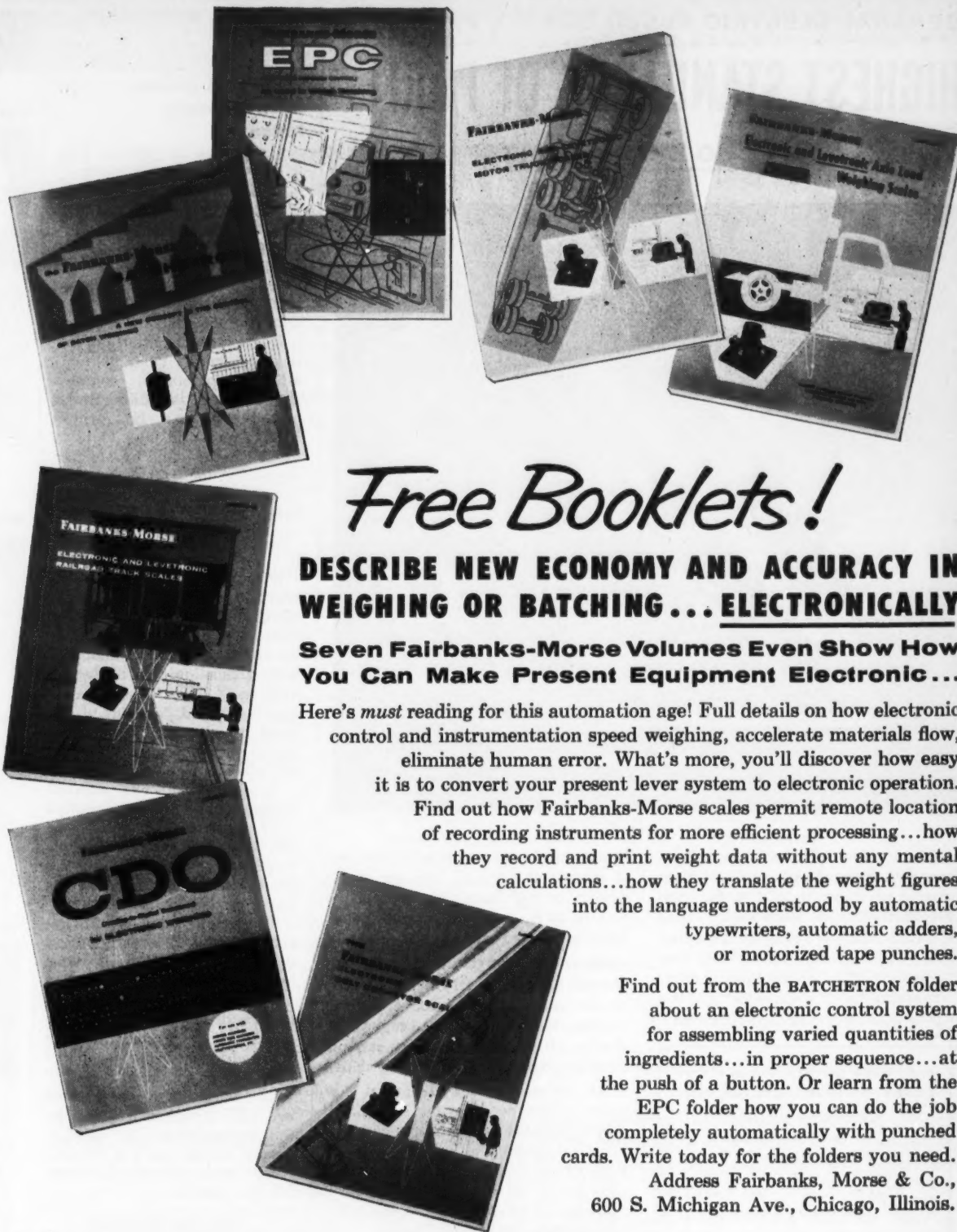
458) o-XYLENE — 99%. Int for phthalic anhydride. High purity. Cosden.

459) ZINC STEARATE — Impalpable M. Tech. MP 118. Lub for plastic molding pwds. Non balling, low compacting. Witco.

460) ZIRCO CATALYST — Advacar 6% for emulsion paints. Improved adhesion, color to latex, alkyds, acrylics etc. Advance Sol.

461) ZOBAR — Weed killer. Dimethylamine salts of tetra and trichlorobenzoic acids. 47.7%. Grasselli.

For more information on product at left, specify 6525 . . . see information request blank opposite last page.



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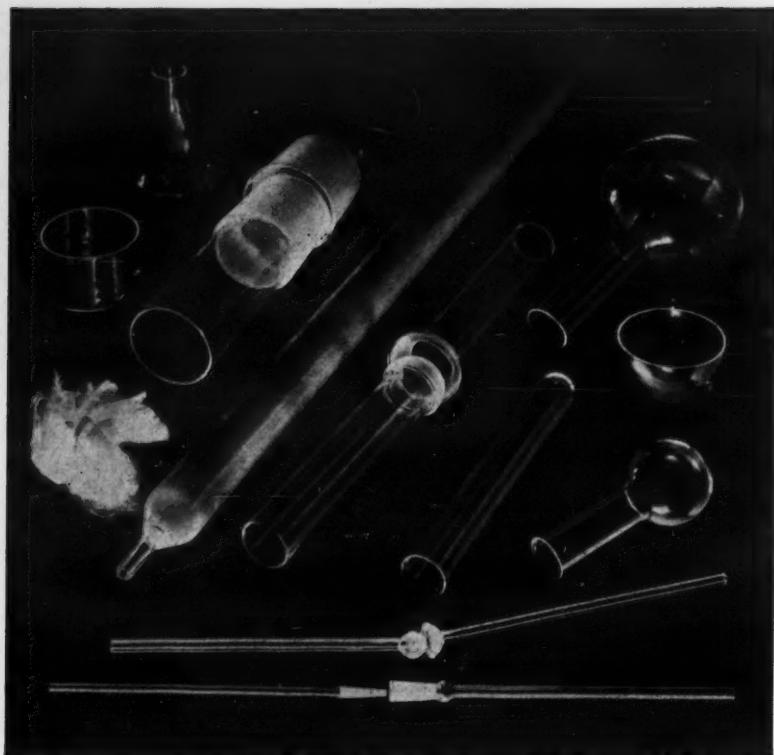
a name worth remembering when you want the BEST

SCALES • PUMPS • DIESEL LOCOMOTIVES AND ENGINES • ELECTRICAL MACHINERY • RAIL CARS • HOME WATER SERVICE EQUIPMENT • MAGNETOS

Check 6526 opposite last page

GENERAL ELECTRIC FUSED QUARTZ PRODUCTS HIGHEST STANDARDS OF PURITY

—AT NO EXTRA COST!



There are four excellent reasons why your primary source of supply for fused quartz products should be General Electric: (1) G-E High Purity Fused Quartz products are completely dependable . . . essentially free of any contamination. (2) General Electric offers a complete line of stock items*. (3) If it can be made from fused quartz, General

Electric can do it—to your specifications of shape and size. (4) You get quick delivery of G-E Fused Quartz products because G.E. now has complete plant facilities devoted exclusively to this end.

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Ball and Socket Joints
Graded Seals—Quartz to Pyrex
Beakers Crucibles
Flasks Test Tubes
Evaporating Dishes

Progress Is Our Most Important Product

GENERAL ELECTRIC

Check 6527 opposite last page

CHEMICAL MATERIALS

Continuous process electrodeposits Teflon

Protective coatings, odd shapes can be made

Wire, metal items, and wire mesh can now be coated with Teflon by electrodeposition. Pipes and tubing can also be lined with this chemically resistant fluorocarbon.

By electrodeposition on collapsible molds, such as metallized elastomers, complex shapes such as bulbs, flasks, and bottles can be formed. Film, sheet, and tape (1 to 20 mils) can be made by electrodeposition of Teflon on continuous conductive or metal belts.

Process Details

Direct current passing through an aqueous dispersion, containing 33 to 35.5% Teflon tetrafluoroethylene resin solids (by wt) stabilized with a non-ionic wetting agent (Triton X-100), causes negatively charged particles of the resin to migrate toward the anode by electrophoresis, and to "plate out" on it.

A source of DC current (either battery or rectified AC), controllable from 0 to 100 volts and from 0.0 to 0.5 amperes, is connected to the electrodes through a voltmeter and an ammeter.

The anode can be in the center, with one cathode on each side. For coating wire continuously, it can be fed vertically upward through a cell, and is made anodic by means of an electrical contact just before entering the polymer deposition bath.

The variables of the process are pH, temperature, foreign ion concentration in the dispersed media, current density, resin solids content, and stabilizer content.

Other Considerations

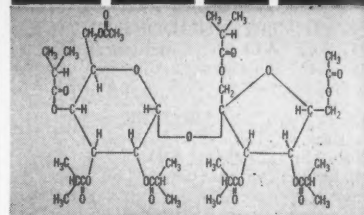
As Teflon is deposited at the anode, some of the metallic particles of the anode are oxidized, forming positive ions. These migrate toward the cathode.

When these metal cations contact negatively charged

Eastman Announces

This is the formula for

S A I B



This is the structure of

S A I B



This is how Eastman sells

S A I B

100% SAIB

SAIB

90% SAIB
IN ETHYL
ALCOHOL

SAIB-90

For more information see opposite page

CHEMICAL PROCESSING

SUCROSE ACETATE ISOBUTYRATE

New resin extender offers outstanding thermal and hydrolysis stability, wide compatibility, low volatility... for lacquers, hot melts and peelable coatings

Here is a new chemical product, Sucrose Acetate Isobutyrate (SAIB), so unlike any known product that its performance characteristics are difficult to classify. Generally, however, they lie between those of a plasticizer and a resin.

Heavy, Compact Molecule

SAIB is made by esterification of sucrose with acetic anhydride and isobutyric anhydride. The result is a clear, extremely viscous liquid of high molecular weight (847). In fact, SAIB is believed to be the heaviest organic monomeric molecule available on a commercial scale. Despite its high molecular weight, SAIB has a singularly compact molecular structure.



Figure 1

Good Permanence

This compactness accounts for SAIB's outstanding stability to heat and water. For example, after six days at 350°F, SAIB shows a change in Gardner color from 3 to only 10. Hydrolysis, after refluxing in water for 4 days, amounted to less than 0.35%. With a boiling

point above 550°F, fuming of SAIB is virtually non-existent at melt temperatures in the neighborhood of 350°F.

Viscous, Soluble, Compatible

The viscosity of SAIB is so high at room temperature, its characteristics approach those of a semi-solid (100,000 centipoises at 30°C). Viscosity changes rapidly with temperature, however, dropping to 4,800 centipoises at 50°C and to 90 centipoises at 100°C. The extreme solubility of SAIB is indicated by the low viscosity (750 centipoises at room temperature) of 90 parts SAIB dissolved in only 10 parts of ethyl alcohol. (See Figure 1) It is in this 90% SAIB-10% ethyl alcohol solution, as well as in the 100% concentrate, that Eastman markets SAIB. In addition to good solubility, SAIB is compatible with a broad range of resins, plasticizers, oils and waxes.

Solvent Coatings

In solvent coating formulations SAIB serves to extend solids content without significantly affecting the ultimate physical properties of the film. For example, the solids content of a lacquer system based on 1/2 sec. RS nitrocellulose can be increased from 20% to 33% by replacing half the nitrocellulose with SAIB, without affecting film hardness or viscosity. Thus, greater surface area coverage per gallon of lacquer can be achieved with reduced solvent requirements. In addition, an improvement in adhesion has been noted.

Hot Melts, Peelable Coatings

Tough, flexible melt coatings can be prepared containing up to 70% SAIB. Properly formulated, such coatings have excellent color stability and exhibit good adhesion, gloss and scuff resistance on paper and cloth. They are also

characterized by an absence of fuming at melt temperatures.

Peelable plastic coatings containing high percentages of SAIB are highly resistant to exudation and retain their flexibility. (See Figure 2)



Figure 2

As a new and unique chemical compound, SAIB is being evaluated by Eastman's Customer Service Laboratories for many industrial applications. A newly published bulletin on this sucrose ester is available. It contains typical formulations for a variety of solvent and melt-type coatings, as well as a description of SAIB's unusual physical properties and performance characteristics. For your copy and for a sample of SAIB, write to Chemical Sales Development Department, Chemicals Division, Eastman Chemical Products, Inc., Kingsport, Tennessee.

SAIB
SUCROSE ACETATE ISO BUTYRATE

CHEMICAL MATERIALS

resin particles near the anode, they neutralize the charges, causing the resin to coagulate. Since the ratio of charge to particle size is so much greater for the metal cations than the resin anions, coagulation results in a very high rate of electrodeposition of Teflon from the dispersion.

Thus, 20 to 50 thousand grams of Teflon resin are deposited per faraday (96,500 ampere-seconds) of electricity, while only 31.8 grams of copper or 32.7 grams of zinc are deposited for an equal amount of electricity.

A problem arises at the cathode, however. Hydrogen gas is evolved and hydroxyl ions are formed. This could form a froth and give uneven current distribution. It can be overcome, however, by separating the cathode from the dispersion by a porous diaphragm.

(Further details may be obtained from Polychemicals Dept., E. I. du Pont de Nemours & Co. (Inc.), Wilmington 98, Delaware.)

Check 6529 opposite last page.

Settling, filtration rates markedly improved by flocculant

Uses: As a coagulant and flocculant.

Features: Coagulant rapidly adsorbs on many types of suspended solids to produce tough, stable flocs. Consequently, the settling and filtration rates of the solid particles are improved markedly. The flocculant is effective over a wide pH range.

Description: Organic flocculating agent is a high-molecular weight grade of water soluble resins. It is available in development quantities as white, crystalline granules.

The application rate generally ranges from 20 ppm up to two percent, based on the weight of suspended solids.

(Polyox coagulant is available from Union Carbide Chemicals Co., Div. of Union Carbide Corp., 30 East 42nd St., New York 17, N. Y.)

Check 6530 opposite last page.

Eastman CHEMICAL PRODUCTS, INC., KINGSPORT, TENNESSEE, subsidiary of Eastman Kodak Company

Check 6528 opposite last page



FLUID FLOW CANS BY CONTINENTAL

BEST FOR *Polishes and Waxes*



Your waxes and polishes take on many new selling advantages when you send them to market in Continental Fluid Flow cans. Consider these features: No drip nozzle of polyethylene for free flow and exact dripless cutoff.

Wrap around lithography: Solderless construction leaves the entire can (dome top, too) free for decoration with Continental's superb lithography.

Matchless beauty that lasts: Protected by a special varnish that prevents marring during display.

Unsurpassed product protection insured by specially developed enamel linings.

Colored nozzles to match or contrast with can design for added sales appeal.

WIDEST RANGE OF SIZES!

Continental Fluid Flow cans are available in the widest range of sizes, every size you want to satisfy your customer's needs, from 12 oz. to one-half gallon. Get the best can for your polishes and waxes, *plus* Continental research and engineering service. Call Continental today.



Eastern Division: 100 E. 42nd St., New York 17
Central Division: 135 So. La Salle St., Chicago 3
Pacific Division: Russ Building, San Francisco 4
Canadian Division: 5595 Pare St., Montreal, Que.

Check 6531 opposite last page

TOO LATE TO CLASSIFY

... in the Use Index or individual compound listings.

AMINE HARDENER — Araldite 956, amine type for epoxies. BP 167. Low irritation potential. Com. Ciba.

ARYL DISULFIDE — Reclaimer 500. Rubber reclaimer. High potency. Com. Pitt-Consol.

BUTANEDIOL DIGLYCIDYL ETHER — Araldite RD-2. Epoxy diluent. BP 275. High flashpoint. Com. Ciba.

2,6-DI-tert-BUTYL 4-METHYLPHENYL DI-n-BUTYL BORATE — Borester 30. MP 167-171. Lub oil antioxidant. Exp. US Borax.

2,6-DI-tert-BUTYLPHENYL DI-n-BUTYL BORATE — Borester 29. Chem pure. MP 150-154 @ 1mm. Lub oil antioxidant. Stable. Exp. US Borax.

2, 5-DICHLORO-3, 6-DIHYDROXY-p-BENZOQUINONE — Strontium derivative. 98% min. Spectro det of fluorides. Exp. Matheson.

N, N-DIETHYL-m-TOLUAMIDE — Insect repellent. Long lasting. Com. Hercules.

GLYCOLIC ACID — Sodium salt. 98% min. Plasticizer int. Exp. Matheson.

METHANOL CATALYST — G-50. Methanol synthesis. High activity. Girdler.

NICKEL CATALYST — G-49. Hydrogenation cat. No organic contam. Com. Girdler.

POLYETHYLENE — A-C pipe compd. Extruding pipe. Resists creep. Com. Semet-Solvay.

POLYETHYLENE — High density. Molding, extruding. Tough, stable. Com. Semet-Solvay.

POLYPROPYLENE — Molding, extruding. Retains rigidity. Com. Hercules.

SPENSOL GREENE — Nitrogen solns. Improved corr inhib. Com. Spencer.

TITANIA — Special-fine. 99+%. Decom at 1640. Cat support. Int Ti metal cmpds. 0.02-0.05 micron. Exp. Electro Met UCC.

TITANIUM MONOXIDE — 99+%. Non-tox. MP 1700. Cat support. Int for titanium metal cmpds. Exp. Electro Met UCC.

TITANIUM SESQUIOXIDE — 99+%. Non-tox. MP 1900. Cat support. Int Ti metal cmpds. Exp. Electro Met UCC.

TUNGSTEN CARBONYL — 97+%. MP 165. Int complex tungsten metallo-organics. Exp. Electro Met UCC.

TUNGSTEN HEXACHLORIDE — 97+%. MP 248. Co-cat for polyolefins. Int metallo-organics. Exp. Electro Met UCC.

XYLYL MERCAPTAN — Rubber Peptizer 640 for natural, syn. Low cost. Com. Pitt-Consol.

DEVELOPMENTAL CHEMICAL MATERIALS

These are the chemical materials made available on developmental or experimental scale from January 1957 through May 1958. List includes only those reported as "new" in composition, purity, form, other properties. If you would like additional information on any item, contact manufacturer. Full names and addresses are on page 93.



500) ACRYLIC RESIN — Cypel Paper Resin. Anionic emulsion. Paper coating. Cyanamid, Ind. Chem.

501) ACRYLAMIDE POLYMER — Accostrength Resin 2386. Anionic modified resin. Improves dry strength in paper. Cyanamid, Ind. Chem.

502) ALLYL CARBAMATE — 99%. MP 19.5. Int pharm, specialty chem. Reactive. Ester, amide linkage. Chem & Plastics FMC.

503) ALLYL CHLOROFORMATE — 99%. BP 113 @ 5mm. Int polymers, specialty chem. Reacts active H₂ cmpds. Chem & Plastics FMC.

504) ALLYL 9,10-EPOXYSTEARATE — BP 282 @ 50mm. Chem int. Polymerizable. Reactive double bond. UCCC.

505) ALUMINUM OXIDE — Alon, 98%. Extreme fine particle size. Cabot.

506) ALUMINUM OXIDE — 97+% Alumina-Laminar. Insul, ceramics, thickener for plastics. Size under 15 microns, high abs for min, veg oils. Monsanto.

507) AMINE RJ-2046 — High mw sec aliphatic amine. BP 170-230 at 10 mm. Rohm.

508) AMINO ACIDS-METALLIC COMPLEXES — 97%. Zn & Mg complexes of arginine & lysine glutamate. General Mills.

509) o-AMINO BENZANILIDE — 95+% MP 128-131. Dyestuff intermediate. Maumee.

510) ̢-AMINO BUTYLMETHYLDIETHOXSILANE — KA-1092 Organofunctional silane. Pure. Sil Div., UCC.

511) α-AMINOGLUTARIC ACID-γ-HYDRAZIDE — 98% min. Peptide synthesis. General Mills.

512) o-AMINO PHENYL THIOBENZOATE — 98%. MP 106-107. Chem int. Maumee.

513) AMINO POLYOL 798 — o,o' bis (diethanolaminoethyl) p-nonylphenol. 95-97%. Corrosion inhibitor, curing agent epoxies. Olin Math.

514) n-AMYL CHLOROFORMATE — 95%. BP 82 @ 50 mm. Int polyurethanes, polycarbonates, pharm. Reacts active H₂ cmpds. Chem & Plastics FMC.

515) ANHYDROENNEAHEPTITOL — 70% aqueous soln. Int alkyd resins, syn drying oils, surface actives. Multiple functionality. Celanese.

516) o-ANISALDEHYDE — 95%. BP 238. Intermediate. Ansul.

517) ARBAN — Triphenyl phosphate derivative. Fire retardant in oil wood preservatives. Dow.

518) ATLAS G-3570 — Tech. Cationized high mw fatty amine. Textile lub, antistatic. Non-yellowing. Atlas.

519) BARIUM ETHYLSULFATE — Elec grade. Micro-wave research. High purity. City Chem.

520) 1,4-BIS(CHOROMETHYL) BENZENE — 96%, MP 101. Int for fibers, coatings, plasticizers. Hooker.

521) 1,4-BIS-(2-HYDROXYPROPYL)-2-METHYLPYPERAZINE — 99%. BP 145 @ 3mm. Cat urethanes, chem int. Odorless. Wyandotte.

522) BIS(TRI-n-BUTYL TIN) OXIDE — 95%. BP 180 at 2mm. Fungicide, bactericide. TBTO Metal & Thermit.

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

versatile, selective
reducing agents,
foaming agents—

**POTASSIUM
BOROHYDRIDE** KBH₄
**SODIUM
BOROHYDRIDE** NaBH₄

4

Potassium Borohydride is easy to handle—has great storage stability plus the versatility and selectivity of other alkali metal borohydrides. Used in reduction of ketones and aldehydes without reduction of double bonds and other reducible groups. Write for Bulletin C-120.

As foaming agents both NaBH₄ and KBH₄ offer high gas evolving capacity: 2.37 liters of H₂ per gram of NaBH₄ (38 cu. ft./lb.) and 1.66 liters of H₂ per gram of KBH₄ (26.6 cu. ft./lb.).

Sodium Borohydride, in a variety of solvents, is commonly used to reduce aldehydes and ketones without effect upon other groups. It has high reducing capacity. Write for Bulletin C-110.

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Check 6532 opposite last page

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centrifugals



This 68" Automatic Reineveld Centrifuge, recently installed at Corn Products Refining Co., Argo, Ill., produces 1 ton of cornstarch powder every 7½ minutes. It dries a 22° Baume Slurry to an average moisture of only 34%. The higher G-forces, possible with a Reineveld Centrifuge, result in drier products and higher tonnages.

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Check 6533 opposite last page

CHEMICAL MATERIALS

523) BUTADIENE MONOXIDE — Com grade. BP 66. Polymerizable monomer, int. Col-South.

524) 3 n-BUTYL BENZOYLENE UREA — 98%. MP 153. Chem int. Maumee.

525) BUTYL CARBAMATE — 99%. MP 54.2-55.0. Int for pharm, insecticides, polymers. Reactive. Ester, amide linkage. Chem & Plastics FMC.

526) 1-n-BUTYL-3-(3,4-DICHLOROPHENYL)-1-METHYLUREA — Karmex N Neburon herbicide, 18.5% active. MP 101-103. Grasselli.

527) BUTYL MERCAPTANS — Com 95+%. Mw 90. BR:n-97-98.5; iso-85.5-88.8; sec-78-86. Solvent, chem int. Phillips Pet.

528) sec-BUTYL 6-METHYL-3-CYCLOHEXENE CARBOXYLATE — BP 109-119 @ 15mm. Water wt liquid. Citrus odor. UCCC.

For easy reference as to specific use, check convenient "Use-Index" page 50

529) CAB-XL — Polyethylene, filler, and cross-linker for molding. Imprvd heat, stress-cracking resistance. Cabot.

530) CADMIUM SILICOFLUORIDE — Elec grade. Micro-wave research. High purity. City Chem.

531) 2-CARBETHOXYCYCLOPENTANONE — Tech BP 122-4 at 25 mm. Arapahoe.

532) β -CARBETHOXYETHYL-TRIETHOXYLANE — XA-1911 Organofunctional silane. Pure. Sil Div, UCC.

533) β -CARBETHOXYPROPYL-METHYLDIETHOXYLANE — XA-1913 Organofunctional silane. Pure. Sil Div, UCCC.

534) CERIUM ETHYLSULFATE — Elec grade. Micro-wave research. High purity. City Chem.

535) 5-CHLORO-2-HYDROXY BENZOPHENONE — HCB. Light stabilizer for vinyl, vinylidene halide plastics. Dow.

536) CHLOROPHENYL SILICONE FLUID — 81644 lub fluid for high temp, jets. Oxidative stable. Silicone GE.

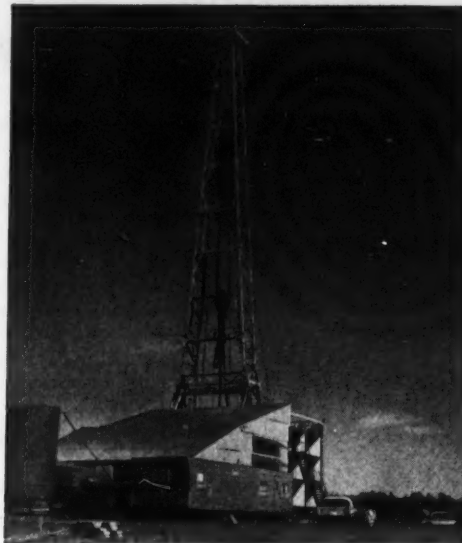
537) α -CHLORO-p-XYLENE — BP 200. Chlorination, nitration, oxidation for flavors, insecticides, resins. Diamond.

538) 2-CHLORO-p-XYLENE — BP 186. Chlorination, nitration, oxidation etc, in flame retardants, hydraulic fluids. Diamond.

539) CITRACONIC ANHYDRIDE — Refined. BP 213-244. Intermediate, curing agent for epoxies. Pfizer.

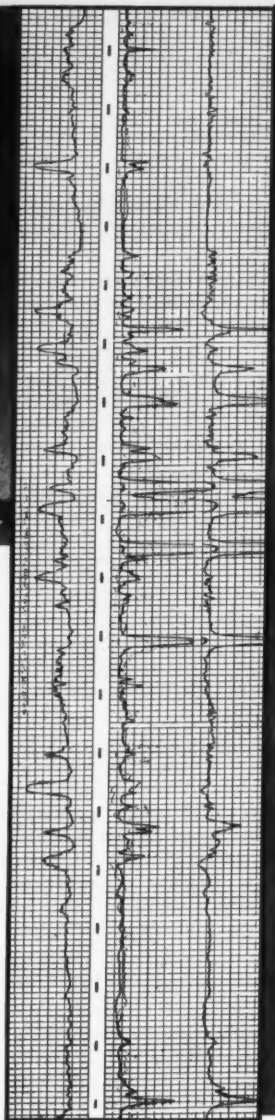
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...news briefs



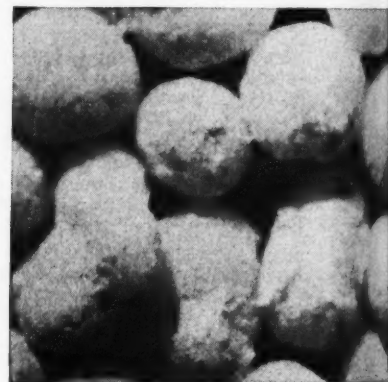
***Salt or Anhydrite Your Drilling Problem?** M & C's Attapulgit drilling clay gives highest yield of any clay in either saturated gyp or brine muds

Electric logging requires good muds—M & C's Attapulgit Clay gives these better muds in fresh water for induction logging and in salt water for gamma ray neutron logging. M & C's Attapulgit drilling clay plus CMC makes the best low fluid loss mud; addition of gyp plus organic thinner gives low gels and low solids muds for highest rate of bit penetration. Attapulgit drilling clay gives a higher yield than bentonite does in either fresh water, gyp or brine. High costs in work-over jobs can be prevented by using M & C's drilling clay plus gyp for a stable high-temperature packer mud. Investigate the unique stability of this outstanding drilling clay. This item is starred. Use the coupon.



Anti-caking Agents keep sticky chemicals free-flowing; M & C offers a complete line of chemical conditioners

Illustration shows ammonium nitrate prills, 10X magnification, coated evenly with an M & C Attapulgit conditioner that provides a highly-sorptive moisture barrier. M & C anti-caking agents include several Attapulgit products and also various surface modified aluminum silicate pigments (ASP's). Investigate the M & C line whenever chemicals must be conditioned against packing effects caused by time of storage, pressure, temperature, humidity and the like. M & C anti-caking agents are neutral-colored, uniform, ultra-fine, inert powders. A little bit goes a long way—usually less than 2% by weight is needed—and they are low in cost, too.



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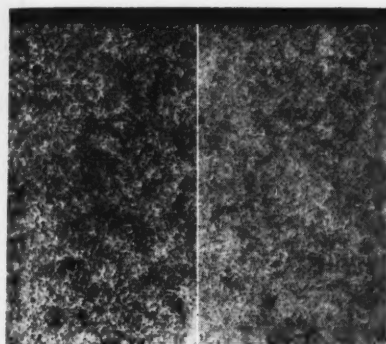
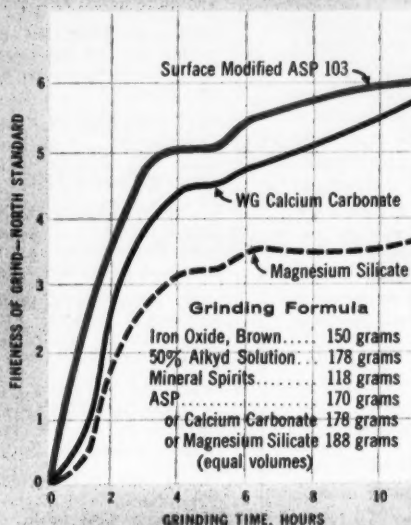
***Reinforced Plastic underbody of sports car exhibits high impact and flexural strengths with ASP filler**

Molded Fiber Glass Body Company, Ashtabula, Ohio specializes in molding large, complex reinforced plastic parts. Photo shows preparation of the preform for a car underbody—a part subject to rugged road shock. Use of ASP fillers gives top reverse impact and 180° flexural modulus values. Molded Fiber Glass Body also reports easier mold release, longer pot life, ideal thixotropy. This is a *starred* item. Use the coupon.



Paint Chemists: new Surface Modified ASP extender pigments reduce grinding time, lower costs

Graph illustrates superiority of M & C's new Surface Modified ASP 103 in gaining desired fineness of grind in quickest time (test details on request). In organic protective systems the new Surface Modified ASP's not only cut grinding time, but also provide superior suspension properties, improved water resistance and adhesion of the film to metallic surfaces. Bulletin T. I. 1026 presents all the data. Use the coupon for your copy and for test samples.



CONTROL ASP 400
Asphalt Laminated Kraft Paper
benefits through penetration control with ASP Additive

Photograph shows marked decrease in molten asphalt penetration in 30-30-30 kraft sheets when M & C's ASP 400 was added to the asphalt system. Without addition of ASP, asphalt can strike completely through the paper—which is undesirable. Laboratory studies indicate that penetration control with ASP's helps solve problems connected with bleeding of the asphalt. Could these additives benefit your formulation? Use the coupon for complete test details.

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For more data, see your Chemical Materials Catalog, Pages 358-362

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• city _____ zone _____ state _____

Check 6534 opposite last page

CHEMICAL MATERIALS

540) L-CITRULLINE — 97%. Hepatic coma therapy. General Mills.

541) 2-CYANOETHYL ACRYLATE — BP 103 @ 10mm. Int resins, fibers, pharm. Intro cyanoethyl group. UCCC.

542) 1,5-CYCLOOCTADIENE — Tech 95%, pure 99+%. BR 148.9-150; MP -69.20. Sp gr 0.8564. Anal inst calib. Chem int. Phillips Pet.

543) DECYLOCTYL ACRYLATE — Polymerizable monomer, int. Rohm.

544) DIALLYL CARBONATE — 99%. BP 88 @ 50mm. Solvent, resin int polycarbonates. Stable ester. Chem & Plastics FMC.

545) 1,4:3,6-DIANHYDRO-D-GLUCITOL — Isosorbide 99%. MP 62. Int surface actives, solvents, resins, inhibitors. Good thermal stability. Atlas.

546) 2,4-DIBENZOYLRESORCINOL — DBR. Light stabilizer for plastics. Dow.

547) DIBORANE — 96+%. High toxicity. MP -164.86; BP -92.53. Poly catalyst. Very reactive. Calvery.

548) DIBUTYL CARBONATE — BP 207. Solvent, resin int polycarbonates. Stable ester. Chem & Plastics FMC.

549) DIBUTYL CHLOROMETHYLPHOSPHONATE — 95+%. BP 101 @ 1.5mm. Explor plasticizer. Borden.

550) DIBUTYLIN SULFIDE — 98%. BP 200. Functional fluid additive, polymerization catalyst, antiozonant. Metal & Thermit.

551) 2,5-DICHLOROBENZOIC ACID — 90%. Int. Hooker.

552) 4,4'-DICHLOROBENZOPHENONE — 98+%. MP 147-148.5; BP 217-219 @ 38mm. Colorless leaflets. Chem int. Diamond.

553) 4,4'-DICHLOROBIPHENYL — 95+%. MP 145. Chem int nitration, chlorination. Stable. Borden.

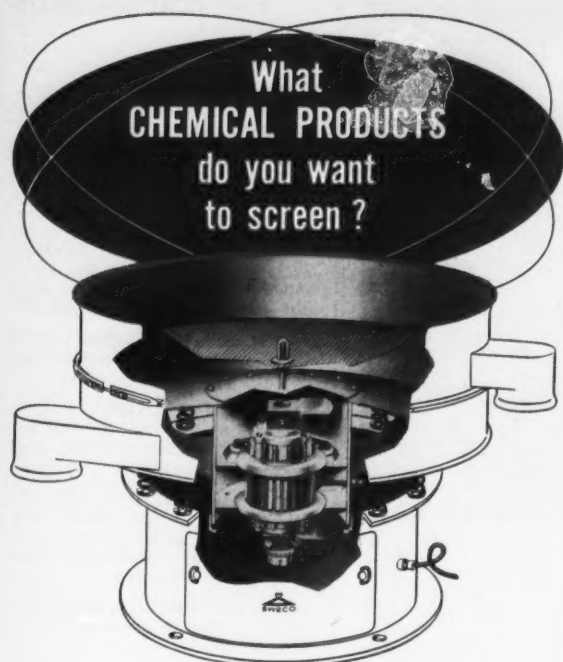
554) 2,4-DICHLORO-6-(O-CHLOROANILINO)-s-TRIAZINE — Tech. BP 160. Ag spray. Fungicide in paint, textiles, adhesives. Non mercurial, low oral tox. Pitts Coke.

555) 4,4'-DICHLORODIPHENYLMETHANE — 95-97%. MP 55; BP 208-210 @ 15mm. Chem int. Colorless needles. Diamond.

556) 4,4'-DICHLORODIPHENYLSULFONE — 98+%. MP 140-144. Organic int. Sol acetone, CCl₄, xylene. Insol H₂O. Diamond.

557) DICHLOROGLYCOLURIL — MP 176. Dry bleach. 65% available chlorine. Diamond.

558) DICHLOROISOCYANURIC ACID — CDB-70. Slight tox. MP 225. Bleaches, water treatment. Stable. Westvaco FMC.



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CHEMICAL PRODUCTS
do you want
to screen?

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| <input type="checkbox"/> Catalysts | <input type="checkbox"/> Organic Chemicals |
| <input type="checkbox"/> Cement | <input type="checkbox"/> Paints |
| <input type="checkbox"/> Ceramics | <input type="checkbox"/> Plastics |
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Check 6535 opposite last page

CHEMICAL MATERIALS

559) 2,5-DICHLORO-4-NITRO-PHENOL — 98+%. MP 117. Odorless, yellow cryst solid. Lamprey larvicide. Diamond.

560) DICYCLOPENTADIENE DIOXIDE — MP 185. Prep heat resist epoxies, mod alkyd polyesters. Int pharm, essential oils, coatings. UCCC.

561) DICYCLOPENTADIENE DIOXIDE — 95%. MP 180-184. Cross linker epoxy, alkyds; phenolic mod. Int perf. Becco FMC.

562) 1,3-DICHLOROPROPANOL-2 — 98+%. BP 174-175. Int. Solvent for cellulose, resins, gums. Colorless, non-flammable. Diamond.

563) 3,4-DICHLOROTETRAHYDROTHIOPHENE-1,1-DIOXIDE — 95%. BP 186 @ 10mm; MP 90-100. Cryst solid. Nematocide, int. Low vapor pres, odorless. Diamond.

564) 2,5-DICHLORO-p-XYLENE — MP 71. Chlorination, nitration, oxidation etc. in flame retardants, hydraulic fluids. Diamond.

565) 4,4'-DICHLORO-p-XYLENE — MP 100. Int chlorination, nitration etc. flavors, insecticides, resins. Diamond.

566) DIDODECYL CARBONATE — 99%. BP 215 @ 1mm. Solvent, resin int. Neutral stable ester. Chem & Plastics FMC.

567) DIETHYLAMINOETHYL CELLULOSE — Reagent, tech, com. Purification of serums etc. Chromat of proteins. Brown.

568) DI-2-ETHYL HEXYL CARBONATE — 99%. BP 173. Solvent, resin int. Stable ester. Chem & Plastics FMC.

569) DI(2-ETHYLHEXYL) CHLOROMETHYLPHOSPHONATE — 95+%. BP 155 @ 1.0mm. Explor plasticizer. Borden.

570) 2,5-DIHYDROXYBENZOQUINONE — Tech. MP 216. Chelating, poly inhib, coupler. Int pharm, antioxidants, dyes. Stable. Eastman.

571) DIHYDROXYCYCLOPENTENES — Com grade mixture. BP 75-125. Polymerizable monomer, int. Col-South.

572) 2,2'-DIHYDROXY-4-METHOXYBENZOPHENONE — UV-24. 98% min. MP 68. Light stabilizer plastics. Non-tox, strong UV absorb. Am Cy.

573) 1,2-DIISOBUTYLENE OXIDE — BP 140.9. Acid acceptor. Int coatings, insecticides etc. UCCC.

574) 4,4'-DIISOCYANATO DIPHENYL METHANE — 98%. BP 213. Isomer free polyurethane int. Carwin.

575) DIISOPROPYLBIPHENYL — 93% mixed isomers. BP 321-333. Nuclear moderator-coolant. Resists radiation. Borden.

"NOSEY" says:



I've got a hunch that lots of folks who could apply odorants with advantage to their product, or at some stage of its processing, avoid doing so because they're just downright timid. The very thought of getting themselves involved in the use of complex aromatic chemicals scares some of them off, I'm sure. 'Course they don't have to know anything about chemistry to use these materials effectively. FRITZSCHE'S Industrial Odorant Laboratories will supply the know-how and the help that's needed. All anyone interested need do is brief FRITZSCHE on his particular product and let their experts carry the ball from that point on. Now, what do you say? Isn't there a place in your business where odorants or deodorants may be used to advantage?

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Check 6536 opposite last page

What's A "New Solution?"

It's an article in CHEMICAL PROCESSING describing a new way of solving a tough plant operating problem. In each issue you will find specific "case histories" showing how these processing problems were solved.

Each article states the operating problem... explains the process used and gives details of how problem was solved... shows results secured.

Take a look at "New Solutions" articles in this issue — they might suggest a "solution" for some of your tough processing problems.

CHEMICAL MATERIALS

576) DIMER ACID — 3065-S. 75% dimer, 25% trimer. Int polyesters for urethane foams. Low cost, excel load bearing foams. Emery.

577) DIMETHALLYL CARBONATE — 99%. BP 202.5. Solvent, resin int polycarbonates. Stable ester. Chem & Plastics FMC.

NAMES AND ADDRESSES of manufacturers, page 93

578) 2,2-DIMETHOXYPROPANE — MP -47. Dehydrating agent, solvent. Dow.

579) DIMETHYLAMINE-BORANE — 97-99%. MP 36; BP 59-65 @ 1-2mm. Toxic. Reducing agent, color stabilizer, antioxidant. Callery.

580) 2,3-DIMETHYL-2,3-BUTANEDIOL — Tech. MP 38. Perfume ingredient. Arapahoe.

581) DIMETHYL CARBONATE — 99%. BP 90.2. Solvent, resin int polycarbonates. Stable ester. Chem & Plastics FMC.

582) DIMETHYLCYCLOHEXANES — trans-1,2; cis-1,2; mixture. Mw 112.21. Analytical inst calib standard. Chem int. Phillips Pet.

583) DIMETHYL DISULFIDE — 99+%. BP 109.6. High dielectric sulfur solvent. Forms sulfoxides, sulfones. Crown Zeller.

584) 2,5-DIMETHYLHEXANE-2,5-DIHYDROPEROXIDE — Luperox 2,5-2,5. 90%. High temp catalyst for polyester premix. Lucidol.

585) DIMETHYL ISOSORBIDE — 99%. BP 235. Solvent, plasticizer for vinyls. Stable, wide sol range, non-toxic. Atlas.

586) DIMETHYL SULFONE — 99+%. MP 109. Molten solvent. Misc water, organics. Crown Zeller.

587) DIMETHYLTIN DICHLORIDE — 95%. BP 189, MP 108. Water soluble. Catalyst, moth-proofer. Metal & Thermit.

588) DIPHENYL CARBONATE — 99%. BP 302-306. Solvent, resin int. Neutral stable ester. Chem & Plastics FMC.

589) DIPENTENE DIOXIDE — MP 185. Diluent epoxies, cross-linker, acid acceptor. Reactive with organic acids. UCCC.

590) DIPHENYLDIDODECYLSILANE — 99%. BP 216 at 10 microns. For high temp, low vapor pressure functional fluids. Metal & Thermit.

591) DITOLYLMETHANE — Mixed isomers. MP 287-292. High boiling solvent, heat transfer, reaction medium. Olin Math.

592) DI(TRIDECYL) AMINE — BP 175 @ 0.3mm. Metal extraction reagent for uranium, thorium. UCCC.

593) DIVINYLSULFONE — BP 234.4. Mod of polyesters, cross linker for cottons, rayons. UCCC.

594) DODECYL BORIC ACID — 95%. Bacteriostat, fungistat, surface active. Preserve, sterilize wood, leather. Callery.

595) DODECYL CHLOROFORMATE — 96%. BP 130 @ 5mm. Int polyurethanes, polycarbonates, pharm. Reacts active H₂. Chem & Plastics FMC.

596) DOWSOL 12 — Mono-1-(isobutyl)-3,5-dimethylhexyl dihydrogen phosphate. Extracting U, V, Th. Dow.

597) DOWSOL 17 — 3,9-diethyltridecyl dihydrogen phosphate. Extracting U, V, Th. Dow.

598) 3,4-EPOXYCyclohexane CARBONITRILE — BP 244.5. Chem int. Reactive epoxy, cyanide groups. UCCC.

599) 1-EPOXYETHYL-3,4-EPOXYCyclohexane — BP 227. Chem int resins with dicarboxylic acids, polyglycols. Reduces epoxy viscosities. UCCC.

600) 2,3-EPOXY-2-ETHYLHEXANOL — BP 131 @ 50mm. Int plasticizers, resins. Reactive epoxy. UCCC.

601) 3,4-EPOXY-6-METHYLCYCLOHEXYLMETHYL-3,4-EPOXY-6-METHYLCYCLOHEXANE CARBOXYLATE — Epoxide 201. Decom below 150 @ 10mm. Stab vinyl chloride. Color stable. UCCC.

602) 3,4-EPOXY-6-METHYLCYCLOHEXYLMETHYL ACETATE — BP 259. Chem int, acid acceptor. UCCC.

COMMERCIALY available materials listing starts page 52

603) EPOXY NOVOLAK — Experimental Resin X-2638.1. Liquid. Laminates, adhesives at 300-500°F. Dow.

604) EPOXY NOVOLAK — Experimental Resin X-2638.2. Semi-solid. High temp adhesives, laminates. Dow.

605) ERBIUM ETHYLSULFATE — Elec grade. Micro-wave research. City Chem.

606) ETHYLENE OXIDE POLYMER — Polyox coagulant for syn latex. MP 65-67. Flocculent for silica, coal, metal ore. UCCC.

607) ETHYL 4-FORMYLBUTYRATE — BP 207. Chem int. UCCC.

608) ETHYL 3-FORMYL PROPIONATE — BP 109.9. Chem int. UCCC.



can you use this CORROSION INHIBITOR?

PQ Sodium Silicate deposits a thin film on metal surfaces which protects them against corrosive attack.

For example, a drop of sodium silicate (ratio Na₂O:3.3SiO₂) stops the attack on aluminum by many alkalis. As shown above, the evolution of gas on the surface of aluminum in the sodium carbonate solution (left) ceases when PQ Silicate is added.

Popular household detergents, industrial and metal cleaners use PQ Silicates for this valuable property. Protection against corrosion in water systems is obtained with 28 parts per million of N (1:3.22 SiO₂) Silicate. (Dosage reduced by 50% after protection established.)

We will be glad to discuss how PQ Silicates' protective action can help you.

Know how PQ Soluble Silicates can help solve a problem in your operations. Ask to be placed on the mailing list of Silicate P's & Q's. Edited monthly for quick reference on silicate developments and research.

PQ Soluble Silicates
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Sodium Sesquisilicate; Sodium
Orthosilicate; Potassium Silicate



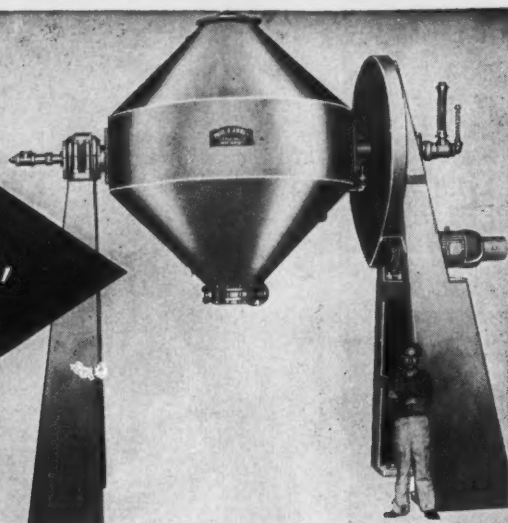
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QUARTZ COMPANY**

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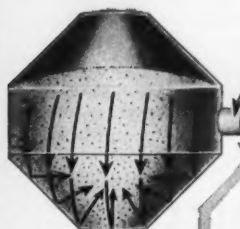
Associates: Phila. Quartz Co. of Calif., Berkeley, Calif.; National Silicates Limited, Toronto, Canada

Check 6538 opposite last page

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The gentle agitation of the Paul O. Abbé Rota-Cone Vacuum Dryer gives the material quick, even, complete drying of the entire batch. No wet and dry spots can occur as with some other types of dryers.

So gently is the material agitated, that there is no contamination or degradation of even the most delicate materials. Yet the entire load is kept constantly in motion so it dries uniformly.

The Paul O. Abbé Rota-Cone Vacuum Dryer can also be used as a Cone Blender. You get the use of two machines for the price of one! The Paul O. Abbé Rota-Cone action produces a perfect blend.

The machine is easy to clean, since there are no agitators or baffles. There is no dust, since an internal filter is used.

The Paul O. Abbé Rota-Cone is safe. No poisonous or otherwise hazardous fumes can escape.

If you are not now using this Rota-Cone, your drying operations suffer.

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PAUL O. ABBÉ

402 CENTER AVENUE LITTLE FALLS, NEW JERSEY

Check 6539 opposite last page

CHEMICAL MATERIALS

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

609) γ -ETHYL-L-GLUTAMATE — 98%. Peptide synthesis, pharm int. General Mills.

610) 2-ETHYL HEXYL CARBAMATE — 99%. MP 39-40. Int pharm, chem specialties. Reactive. Ester, amide linkage. Chem & Plastics FMC.

611) 2-ETHYL HEXYL CHLOROFORMATE — 99%. BP 100 @ 25mm. Int polyurethanes, polycarbonates, pharm. Reacts active H₂ cmpds. Chem & Plastics FMC.

612) 2-ETHYL-4-METHYLPENTYL ACETATE — BR 185-195. Slow-evap solvent for coatings, dipping lacquers. Low water sol. Eastman.

613) 2-ETHYL-4-METHYLVALERIC ACID — BR 216-224 @ 738 mm. Chem int stabilizers, lubs, resins, solvents. Eastman.

614) ETHYL 3-OXATRICYCLO (3.2.1.0^{2,3})-OCTANE-6-CARBOXYLATE — BP 255.8; 162 @ 50mm. Chem int, acid acceptor. UCCC.

615) ETHYLSULFONYLETHANOL — 98% min. LD₅₀ 18 g/kg. MP 41. Antistatic agent syn fibers, humectant, solvent. Water sol. Pennsalt.

616) FERRIC OXIDE — 98%. Pyrogenic. Coatings, plastics, electronics. Fine particle size. Cabot.

617) FERROUS CHELATE — of Sodium Glucoheptonate. Medicinal grade of non-toxic chelate of iron. Phanstiehl.

618) GADOLINIUM ETHYLSULFATE — Elec grade. Micro-wave research. High purity, neutron abs cross section. City Chem.

619) HEPTYL p-HYDROXYBENZOATE — Pure. MP 50-2. Fungicide. Heyden.

620) HET DIOL — 5,6-Di(hydroxymethyl)-1,2,3,4,7,7-hexachlorobicyclo-[2.2.1]-heptane-2. MP 204-8. Hooker.

621) α , α' -HEXACHLORO-p-XYLENE — MP 110. Int chlorination, nitration etc. for flavors, insecticides. Diamond.

622) HEXYL p-HYDROXYBENZOATE — Pure. MP 53-5. Fungicide. Heyden.

623) L-HOMOCITRULLINE — 97%. Biochemical int. General Mills.

624) HYDRAZINE DIHYDROCHLORIDE — Tech. Toxic. MP 195-200. Wt crys solid. Cl scavenger in HCl. Source of hydrazine. Sol water. Olin Math.

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by **INFILCO** to meet
most efficiently your
liquid mixing
requirements . . .

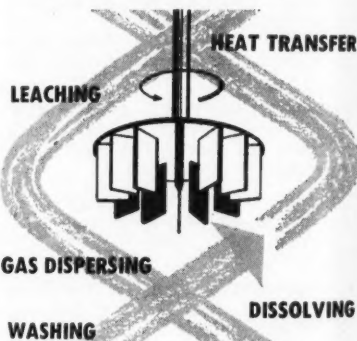
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Check 6540 opposite last page
CHEMICAL PROCESSING

CHEMICAL MATERIALS

625) **HYDRAZODICARBONAMIDE** — Tech. Toxic. Wt crys solid. MP 256-258. Prep polyamide thermosets, blowing agents. Sol alkali, conc HCl. Olin Math.

626) **HYDROCARBON RESIN** — WX-561. Inks, metal coatings, varnish. High thermal reactivity. Velsicol.

627) **HYDROCARBON RESIN** — WX-599. Caulking cmpds, mastics, rubber cmpding. Pale color. Velsicol.

628) **HYDROXYPROPYL GLYCERINE** — Hyprin GP 25. Plasticizer for cellulosic matl, polyurethane crosslinking agent. Dow.

629) **HYDROXYPROPYL SUCROSE** — Hyprose SP 80. Polyurethane crosslinking agent, plasticizer for cellulosic matl. Dow.

630) **IGEPAL DM-430** — Pure. Emulsifier in ag chem, aerosols. Antara.

631) **IGEPAL DM-730** — Pure. Surfactant in high conc electrolytes, latex stabilizer. Antara.

632) **IGEPAL DM-880** — Pure. Stable to storage at high temp. Antara.

For easy reference as to specific use, check convenient "Use-Index" page 50

633) **IGEPAL RC-520** — Pure. Oil-soluble. Stable to storage at high temp. Antara.

634) **IGEPAL RC-630** — Pure. Acid cleaning, ag chem emulsifier. Antara.

635) **IGEPAL RC-760** — Pure. Highly water-soluble. Antara.

636) **IGEPAL RC-890** — Pure. Emulsifier, latex stabilizer, high-temp acid cleaners. Antara.

637) **ISODECYL AMINE** — Mixture of decyl amine isomers. BP 203.7. Int corr inhib, pharm, surface actives, dyes. UCCC.

638) **ISOCTANOIC ACID** — 100%. BP 223-230. Colorless liq. Int for metallic soaps. Gulf.

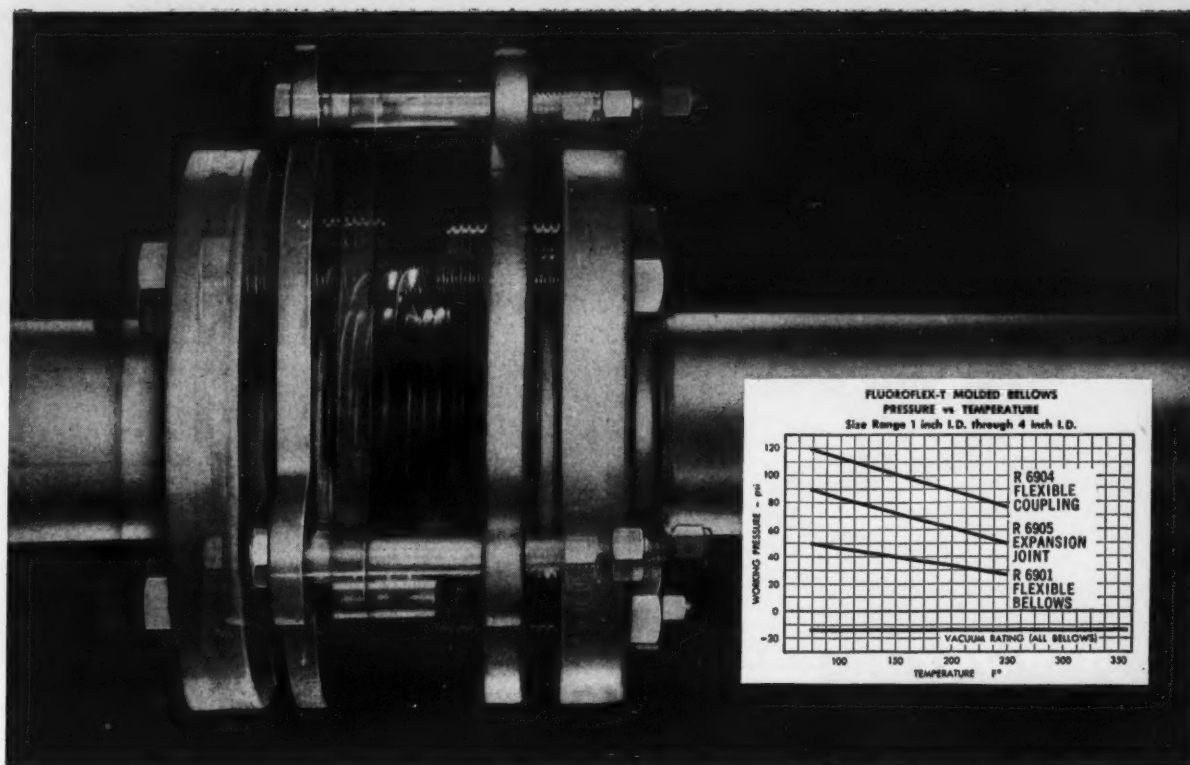
639) **ISOCTYL ALDEHYDE** — 100%. BP 157-162. Intermediate. Gulf.

640) **ISOCTYL AMINE** — 99%. BP 160-170. Dispersing pigment. Int for surfactants, lube additive. Gulf.

641) **ISO-PENTALDEHYDE** — BP 103.3. Prep of oil sol resins, rubber accel. Chem int. UCCC.

642) **ISO-PENTANOIC ACID** — Dist range 179-187. Int plasticizers, pharm, vinyl stabilizers. UCCC.

643) **ISOPHTHALOYL CHLORIDE** — 98%. MP 43.4. For fibers, films, coatings. Hooker.



Fluoroflex[®]-T expansion joints molded from Teflon[®] stand higher dynamic pressure

- **Work over wide pressure range** — and under full vacuum, too
- **Unequalled flex life** — achieved through special compound of Teflon
- **Molded — not machined** — for undamaged grain structure and interior convolutions that don't fatigue and crack
- **Corrosion-proof** — universally useful with all fluids and all types of piping

® Fluoroflex is a Resistoflex trademark, reg., U.S. pat. off.
® Teflon is DuPont's trademark for TFE fluorocarbon resins.

Fluoroflex-T bellows and flex joints are made of a special high density compound . . . Teflon at its best. Molding assures the optimum tensile and fatigue strength.

RESULT: *Twice the burst strength*, after flexing . . . 20 to 30 times the flex life of ordinary bellows machined from Teflon!

Chemically as well as physically durable, Fluoroflex-T bellows are inert to virtually all known chemical and corrosive solutions.

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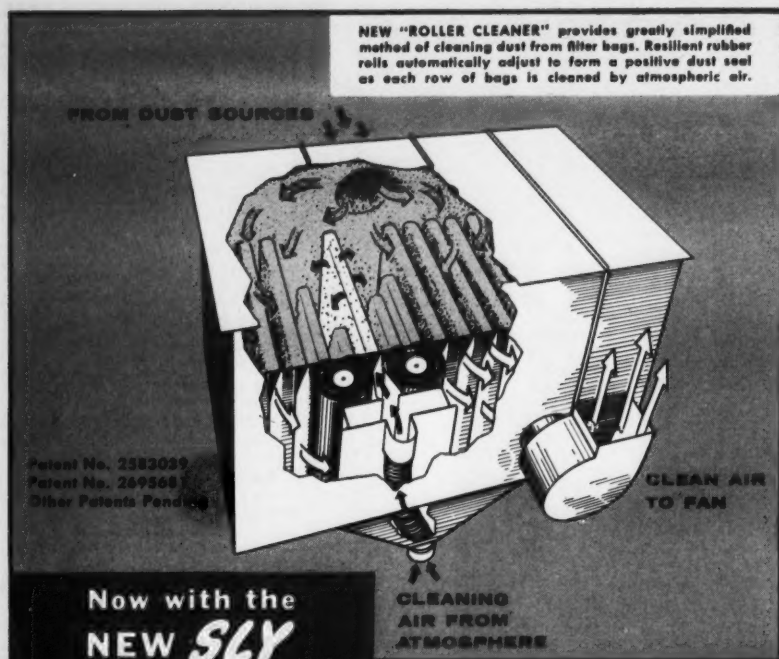
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Check 6541 opposite last page



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**As much as
3 TIMES LONGER
BAG LIFE**

NEW SLY "RESIST-O-WEAR" FILTER BAGS (patent pending) provide complete dust filtration with as much as three times longer life than conventional bags. This has been proved on the toughest field installations.

The new bag has three equal-size sections. Each pocket has two spacers, making a total of six per bag. Weight is distributed on

three seams rather than one, minimizing strain. A special protective flap on the back end prevents abrasion from incoming dust.

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- Constant suction at dust sources — complete dust collection.
- Greater filtering capacity; smaller space requirements.
- Automatically self-cleaning for continuous operation.
- Simplified construction for ease of inspection and servicing.

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New 36-page Dust Control Catalog 104.



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Check 6542 opposite last page

CHEMICAL MATERIALS

644) **ISOPROPYL CARBAMATE** — 99%. MP 94-95. Int for pharmaceuticals, pesticides, polymers. Chem & Plastics FMC.

645) **ITACONIC ANHYDRIDE** — Tech. MP 65. Intermediate, monomer. Pfizer.

646) **KETONE PEROXIDE** — Luperox No. 6. 90%. BP 66-8. Fast room-temp catalyst for polyester. Lucidol.

647) **KETONE PEROXIDE-DIBUTYL PHTHALATE** — 50% peroxide. Fast room-temp catalyst for polyester. Lucidol.

648) **LAURYL ACRYLATE** — Polymerizable monomer, int. Rohm.

649) **LAURYL CARBAMATE** — 97%. MP 82.5-83.5. Int pharm, chem specialties. Reactive. Ester, amide linkage. Chem & Plastics FMC.

650) **LIMONENE DIOXIDE** — 90%. BP 162 @ 99mm. Epoxy dil, phenolic mod, alkyd cross link. Int perf. Low tox. Becco FMC.

651) **α -MENAPHTHYL ALKYL DIMETHYL AMMONIUM CHLORIDE** — 100%. Powdered biocide, algicide, fungicide. High hard water tol (1300ppm). Onyx.

**NAMES AND ADDRESSES of
manufacturers, page 93**

652) **METHALLYL ACETATE** — 97%. BP 124.5. Int adhesives, coatings, laminates. Higher double bond activity. Chem & Plastics FMC.

653) **METHALLYL ALCOHOL** — 98%. BP 114.5. Int adhesives, coatings, laminates. Higher double bond reactivity. Chem & Plastics FMC.

654) **METHALLYL CARBAMATE** — 99%. MP 53.5-54.6. Int pharm, specialty chem. Reactive. Ester amide linkage. Chem & Plastics FMC.

655) **METHANE SULFONYL CHLORIDE** — 99%. BP 164. Int for dyes, pharmaceuticals. Stauffer.

656) **METHYLACETYLENE-PROPADIENE** — Mixture. Intermediate, specialty fuel. Dow.

657) **4-METHYLBENZOIC ACID** — 98%. Int polymers, syn fibers. High purity, good color. Cowles.

658) **METHYL BORATE AMMONIA** — 95%. Low toxicity. Sublimes 45. Solid source of methyl borate. Volatile. Callery.

659) **3-METHYL-1-BUTANETHIOL** — Com 95+%. BR 235-246°F. Sp gr 15.6/15.6: 0.8418. Chem int. Phillips Pet.

660) **2-METHYL-1-BUTANOL** — BP 128. Solvent, chem int pharm, resins, surface-actives. UCCC.

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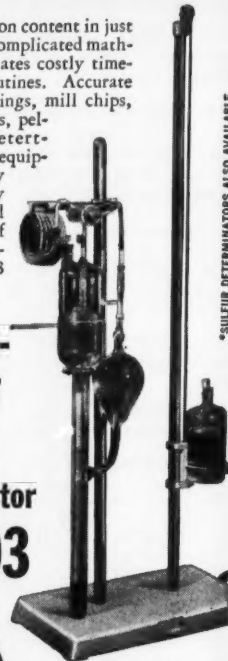
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Check 6543 opposite last page
CHEMICAL PROCESSING

CHEMICAL MATERIALS

661) METHYL BUTENOL — 95% min. BP 96-97.5. Int pharm, perf, isoprenoid chem. Air Reduc.

662) METHYL CARBAMATE — 99%. MP 55.0. Int pharmaceuticals, pesticides, polymers. Reactive. Ester, amide linkage. Chem & Plastics FMC.

663) 2-METHYL 3-CARBOXY 4-HYDROXYQUINOLINE — 98%. MP 245. Pharm int. Maumee.

COMMERCIALY available materials listing starts page 52

664) METHYL CHLOROFORMATE — 99%. BP 72. Int polymers, pharm, specialty chem. Reacts active H₂ cmpds. Chem & Plastics FMC.

665) 2-METHYL-2-ETHYL-1,3-DIOXOLANE — BP 117.6. Reaction medium, solvent, chem int. UCCC.

666) γ-METHYL-L-GLUTAMATE — 98% min. Peptide synthesis. General Mills.

667) N-METHYL ISATOIC ANHYDRIDE — 97%. MP 175. Flavor, perfume int. Maumee.

668) METHYL NADIC ANHYDRIDE — 99%. BP 180.2. Liquid curing agent for epoxies. Nat Aniline.

669) 2-METHYL-1,3-PENTANEDIOL — BP 220.3. Chem int plasticizers, polyesters, lubs. UCCC.

670) 4-METHYLPENTENE-1 — 99+%. BP 54; MP -154. Sp gr 20/4: 0.6640. Organic syn. Phillips Pet.

671) cis-4-METHYLPENTENE-2 — Pure 99+%. BP 56; MP -134. Sp gr 0.6692. Chem int. Phillips Pet.

672) METHYL SUCCINIC ANHYDRIDE — Refine. M_T 37. Intermediate, curing agent for epoxies. Pfizer.

673) 2-METHYLTETRAHYDROFURAN — Ind. BP 80. Reaction solvent medium. Chem int. Quaker Oats.

674) MICA, SYNTHETIC — Synthamica 621 electrical grade. MP 1365. Filler for plastics. Excellent bond to matrix. Mycalex.

675) MONOHYDRAZINIUM PHOSPHATE — Tech. Toxic. MP 81-83. Boiler water treatment. Source of hydrazine. Olin Math.

676) MONOISOPROPYLBIPHENYL — 62%-m, 38%-p. BP 295-300. Nuclear moderator-coolant, resists radiation. Borden.

677) MOLYBDENUM HEXACARBONYL — Catalyst (oxo-type reaction), vapor phase plating. Climax.

678) 1-NAPHTHYL-N-METHYL-CARBAMATE — Crag Sevin insecticide. MP 142. No P or Cl. Controls codling moth, apple aphids, maggot etc. UCCC.

679) NEODYMIUM ETHYLSULFATE — Elec grade. Micro-wave research. High purity. City Chem.

680) NICKEL SILICOFLUORIDE — Elec grade. Micro-wave research. High purity. City Chem.

681) t-NONYLAMINE — Chem int. BP 85-92 @ 52mm. High assay. Borden.

For easy reference as to specific use, check convenient "Use-Index" page 50

682) NONYL BORIC ACID — 95%. Bacteriostat, fungistat, surface active. Leather, cloth preservation, sterilization. Callery.

683) N-(OCTENYL)CYCLOHEXYLAMINE — Solvent, int. Mod toxicity, BP 127-128 @ 13mm. High assay. Borden.

684) N-(OCTENYL) ETHANOLAMINE — Solvent, chem int. BP 127-128 @ 13mm. High assay. Borden.

685) n-OCTYL MERCAPTAN — Com 95+%. Sp gr 15.6/15.6: 0.8479. BR 368-431. Chem int. Phillips Pet.

686) OXO-HEXADECYL TOSYLATE — Hexadecyl ester of p-toluenesulfonic acid, 93%. Intro of isohexadecyl group. Fine Organics.

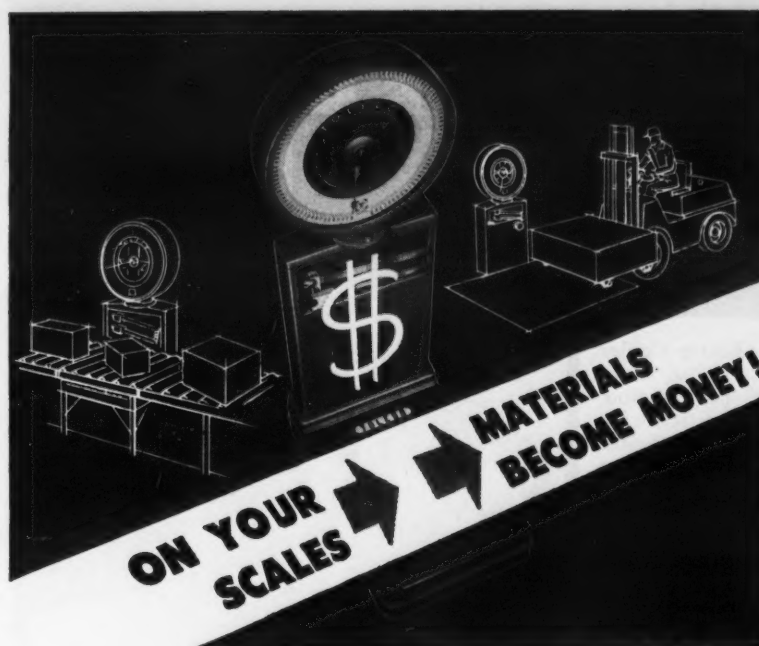
687) PENTABROMOPHENOL — Tech. BP 225-6. Flame-retarding. Protects cellulosic building matl against mildew, termites. Michigan.

688) 1,3-PENTADIENE — Com 90%. BR 108-116°F. Sp gr 60/60°F 0.6988. Chem int. Phillips Pet.

689) 1-PENTANOL — BP 138. Int pharm, plasticizers, lubs, corr inhib, wetting agents. UCCC.



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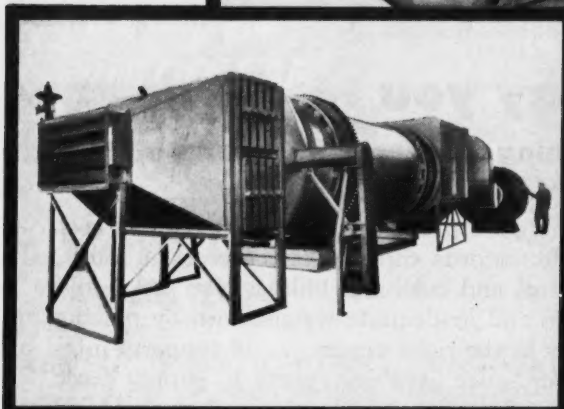
REMOTE
DIGITAL
WEIGHT
RECORDING

Check 6544 opposite last page

RENNEBURG PROCESS EQUIPMENT

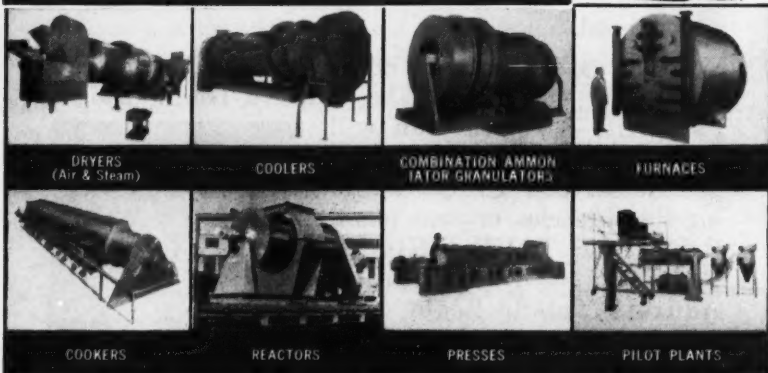
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CHEMICAL MATERIALS

690) PERCHLOROPENTACYCLODECANE — Tech. MP 485. $C_{10}Cl_{14}$. Flame retardant, paper impregnant, rubber modifier. Hooker.

691) PERCHLORYL FLUORIDE — 98%. Mod tox. BP -46.8. Refrig, bleach, explosives. Perchlorylation. Safely stored, shipped liquid. Pennsalt.

692) PERFLUOROPROPANE — BP -37. Gaseous dielectric. High purity, low tox. Chem and therm stable. Gen'l Allied.

693) PHENYL CARBAMATE — 99%. MP 148-150. Int pharm, specialty chem. Reactive. Ester, amide linkage. Chem & Plastics FMC.

694) PHENYL CHLOROFORMATE — 97%. BP 192. Int polyurethanes-carbonates, specialty chem. Reacts active H_2 . Chem & Plastics FMC.

For easy reference as to specific use, check convenient "Use-Index" page 50

695) 3-PHENYL-1,1-DIMETHYLUREA — Karmex FP Fenuron herbicide 25% active. MP 127-129. Non-corrosive, non-volatile. Grasselli.

696) 3-PHENYL 4-KETOBENZOTRIAZINE — 98%. MP 223. Chem int. Maumee.

697) POTASSIUM CHROMICYANIDE — Elec grade. Microwave research, maser. High purity. City Chem.

698) POTASSIUM COBALTICYANIDE — Elec grade. Microwave research, maser. High purity. City Chem.

699) POTASSIUM-DI-(OCTYL)-SULFOSUCCINATE — Monawet MO-70-K. 70% liquid. Wetting, dispersing, laxative. Mona.

700) POTASSIUM MANGANICYANIDE — Elec grade. Microwave research. High purity. City Chem.

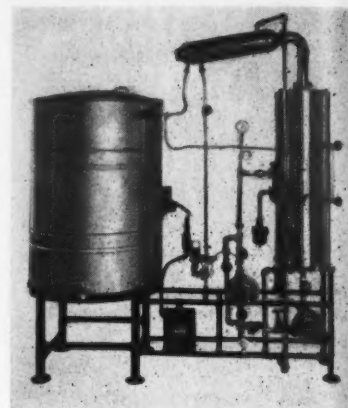
701) POTASSIUM PERSULFATES — Oxone Monopersulfate Compound. $KHSO_5 \cdot KHSO_4 \cdot K_2SO_4$. Tech. For bleaches. Du Pont, Electro.

702) POLYETHYLENE, HIGH DENSITY — Super Dylan KPD-375 100%. MP 130. Thin-wall molded parts. Easy flow, clear film. Koppers.

703) POLY(1-PHENYL-3-METHOXY BUTANE — Durrans' soft pt: 97. Coatings. Shell Chem.

704) POLYPROPYLENE GLYCOL TRIGLYCEROL ETHER — Polyglycols 11-80, 11-100, 11-200, 11-300, 11-400, 112-3. Polyurethane int, plasticizer. Dow.

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Check 6546 opposite last page
CHEMICAL PROCESSING

Check 6545 opposite last page

CHEMICAL MATERIALS

705) **POLYSTYRENE** — Dyline 201. High impact extruded sheet for vacuum forming. Excel surface gloss. Koppers.

706) **POLYSTYRENE** — Dylene 30 KPD-501. Med impact. Extrusion, injection molding. High surface gloss. Koppers.

707) **POLYURETHANE** — Spengel F77-60 MS. 60% solids. 1 can stable vehicle for paints. Spencer Kel.

708) **POLYURETHANE** — Spengel P18-50X (50%); P23-75S (75%); P93-80X (80% solids). Prepolymer vehicles for paint — 2-can system. Spencer Kel.

709) **POLYVINYL CHLORIDE** — PVC-FGX. Very low mol wt, USP-0.60, for floor tile. Diamond.

710) **POLYVINYL CHLORIDE** — PVC-DX-30. Very low mol wt, USP 0.60 for calendered, molded, extruded plastics. Diamond.

711) **PRASEODYMIUM ETHYL-SULFATE** — Elec grade. Micro-wave research. High purity. City Chem.

712) **PROPIONITRILE** — 93-95%. MP 95-99. Solvent pet hydrocarbons. Int pharm, ion exchange resins, insec. UCCC.

713) **n-PROPYL MERCAPTAN** — 98%. BP 65.0-70.0. Int ag chem, pharm. Pennsalt.

714) **n-PROPYL MERCAPTAN** — Com 95+%. BR 148-154°F. Sp gr 13/15 0.8440 Sulfur wt 40.9%. Odorant, chem int. Phillips Pet.

715) **PYRIDINE-BORANE** — 97-99%. MP 10-11; BP 65 @ 1mm. Antioxidant, color stabilizer, inhibitor, reducing agent. Callery.

716) **SILICONE-PHENOLIC RESIN** — In naphthol mineral spirits. Solder mask, coating for printed circuits. Dow Corning. R-875.

COMMERCIALY available materials listing starts page 52

717) **SODIUM DICHLOROISOCYANURATE** — CDB-60. Slight tox. MP 230-250. Bleaches, water treatment. Stable, high sol. Westvaco FMC.

718) **SODIUM MANGANICYANIDE** — Elec grade. Micro-wave research. High purity. City Chem.

719) **SODIUM METHYL CARBONATE** — 95%. MP 330. Corrosion inhibitor, fire retardant, methylating agent. Callery.

720) **SODIUM TETRAMETHOXYBORATE** — 95%. Low toxicity. MP 240. Complexing agent aldehydes, ketones. Callery.

721) **STYRENE OXIDE** — MP -36.8; BP 194.1. Stabilizer chlorinated rubber, diluent epoxies, Chem int. UCCC.

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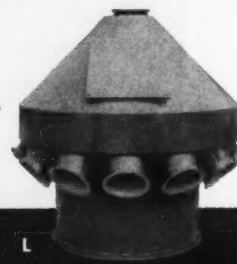
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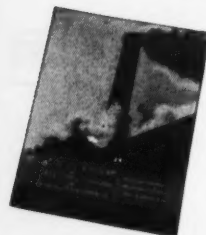
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Check 6550 opposite last page

CHEMICAL MATERIALS

722) SUCROSE ACETATE ISO-BUTYRATE — SAIB BP >288. Extender for film formers. Lt color, low vol, thermal stability. Eastman.

723) SYL-KEM 90 — 1,3-bis[3 (2,3-epoxypropoxy) propyl]-tetramethyldisiloxane. Reactive diluent for epoxy resins. Dow Corning.

724) TEREPHTHALOYL CHLORIDE — 98%. MP 81. For fibers, films, coatings. Hooker.

725) TETRABROMOBISPHENOL-A — Tech. MP 162-3. Imparts flame retarding properties to resins where bisphenol-A is used. Michigan.

726) TETRA-n-BUTYL TIN — 95%. BP 145 at 10 mm. Stabilizer for chlorinated organics. Lube. gasoline additive. Metal & Thermit.

727) TETRAHYDROTHIOPHENE-1,1-DIOXIDE — Pure. Mw 120.16. BP 270.5; MP 27.2. Sp gr 30/4: 1.20606. Vis 10.301 cps. Cat synthesis. Phillips Pet.

728) 1,2,4,5-TETRAMETHYLBENZENE — Durene. 98%. MP 77. Block polymer int. Shell Chem.

729) TETRAMETHYLETHYLENEDIAMINE — 70% aq soln. Intermediate. Rohm.

NAMES AND ADDRESSES of manufacturers, page 93

730) TETRACHLOROGLYCOLURIL — MP 166. Dry bleach, bactericide. 95% available chlorine. Diamond.

731) 2,3,5,6-TETRACHLOROPXYLENE — MP 223. Chlorination, nitration, oxidation etc. for fire retardants, hydraulic fluids. Diamond.

732) 3,3'-THIODIPROPIONIC ACID — Antioxidant oils, fats, cereals. MP 130. V low toxicity. Borden.

733) THPC — Tetrakis(hydroxymethyl) Phosphonium Chloride. 95%. MP 110-30. For fire-retardant resins. Hooker.

734) TITANIUM DIOXIDE — 98%. Pyrogenic. Textile printing, cosmetics, electronics. Ext fine particle size. Cabot.

735) 2,4,6-TRICHLOROANISOLE — 95%. Wt crystalline solid. BP 132 @ 28mm; MP 57-59. Int. Dye assist for polyesters. Stable in acid, alkaline. Diamond.

736) TRICHLOROISOCYANURIC ACID — Com. MP 225-230. Dry solid for bleaches, ind sanitizers. High available chlorine. Westvaco.

737) n-TRIDECANE — 99+%. BP 227; MP -5.6. Sp gr 20/4 0.7565. RI 20/D: 1.42150. Int, ore flotation. Phillips Pet.

CHEMICAL PROCESSING

CHEMICAL MATERIALS

738) TRIFLUOROETHANOL — 96% min. LD₅₀ 300 mg/kg. BP 72-75. Int dyes, pharm, plastics. Presence of F adds stability. Pennsalt.

739) TRIFLUOROETHYL CHLORIDE — 99%. Tox: ca 150,000-ppm (white rats). BP 6.1. Propellant, refrigerant, chem int. F adds stability. Pennsalt.

740) TRIISOBUTYLENE OXIDE — Isomer mixture. BP 202.5. Acid acceptor, chem int. Epoxy reactions. UCCC.

741) TRIISOOCTYL AMINE — 100%. BP 348-358. Solvent extraction of U and rare earths. Gulf.

742) TRIMETHYL ACETIC ACID — Tech. MP 35. Intermediate. Arapahoe.

743) TRIMETHYLAMINE-BORANE — 97-99%. MP 94; BP 171. Toxic antioxidant, reducing agent, color stabilizer. Calleg.

744) 2,2,4-TRIMETHYL-1,3-PENTANEDIOL — 95% min. BR 109-111 @ 4 mm. Base for syn lubs. Eastman.

Unless otherwise specified . . .

Pressures are mm Hg (abs)
Boiling Points are at 760 mm
Temperatures are in °C
Solubilities are at room temp

745) 2,4,4-TRIMETHYL-1-PENTANETHIOL — BR 303-347°F. Sp gr 15.6/15.6: 0.8464. Chem int. Phillips Pet.

746) TRIPHENYL ANTIMONY — 96%. BP 377. Lube additive, catalyst, vulcanizing agent, flame retardant. Metal & Thermit.

747) TRIPHENYLPHOSPHORUS — 95%. Catalysts, moth repellent, stabilizer. Metal & Thermit.

748) TRISISOCTYL PHOSPHATE — 99+%. BP 203 @ 3.5 mm. Chem int. Borden.

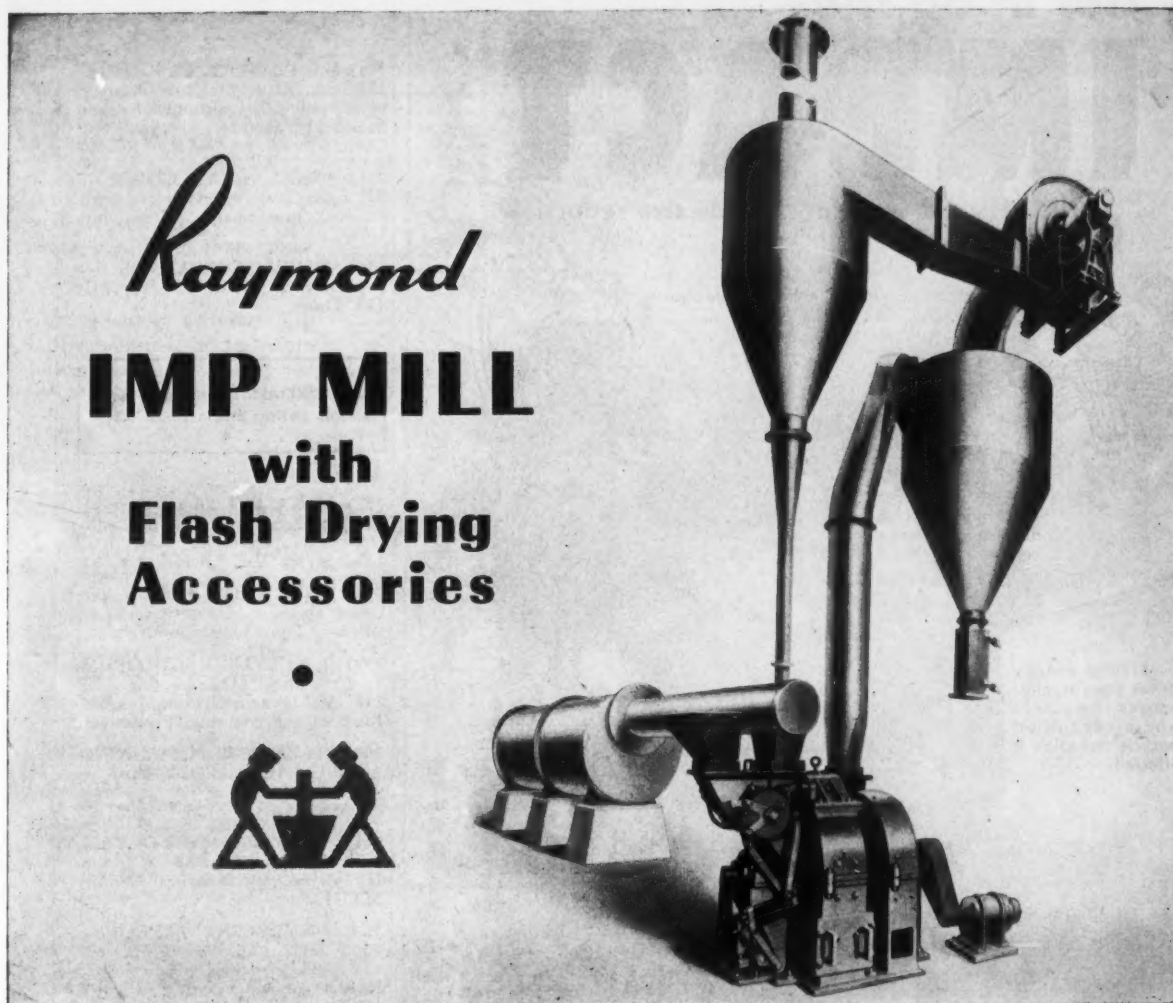
749) TYRAMINE HYDROCHLORIDE — 98%. Biochemical int. General Mills.

750) URANIUM CARBIDE — Reactor grade for graphitic, solid fuel elements. Density 13.6 g/cc. Built-in mod. Mallinckrodt.

751) URANIUM NITRIDE — Reactor grade for high melting, solid fuel elements. High density, variety of enrich. Mallinckrodt.

752) VALERALDEHYDE — BP 103.3. Int rubber accelerators, resins. UCCC.

753) VALERIC ACID — BP 186.2. Extraction of mercaptans. Int flavors, pharm, vinyl stabilizers. UCCC.



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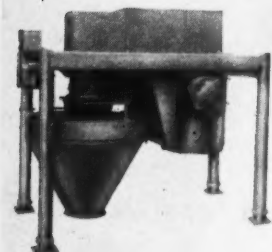
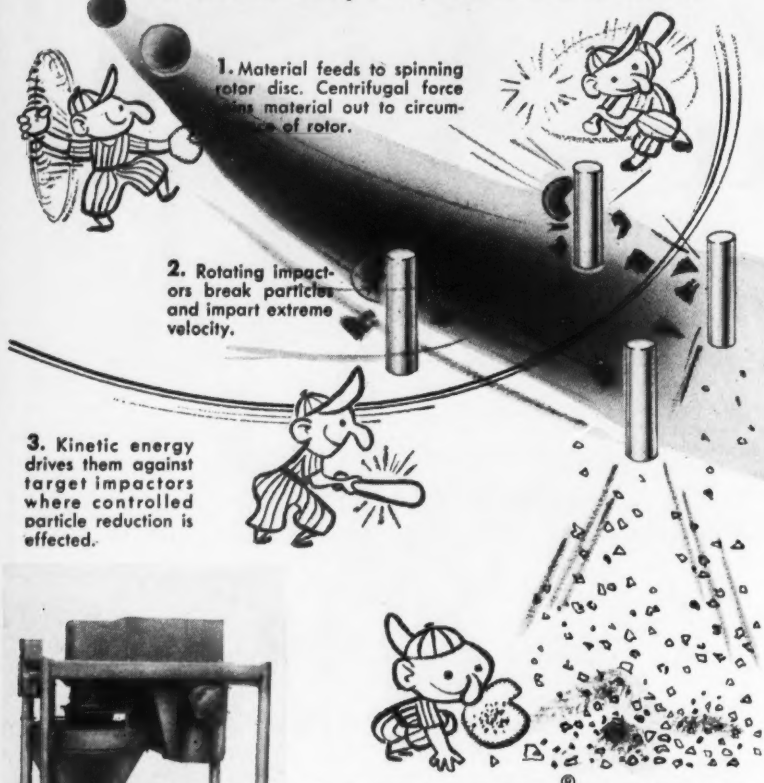
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CHEMICAL MATERIALS

754) V-C PLASTICIZER — 1-318-19. Tech. Acute oral tox. Primary plast polyvinyl alcohol. Reduce flammability, increase strength. V-C Chem.

755) VINYL ALLYL ETHER — BP 67.4. Prep of polymers with residual functionality. Chem int. UCCC.

756) VINYL COPOLYMER — Experimental Resin X-2716. MP 150. Dow.

COMMERCIALY available materials listing starts page 52

757) VIRCO-PET 20 — Corr inhib petroleum prod, coatings, antifreeze. Works under acid cond. LD₅₀ 5g/kg. V-C Chem.

758) VITEL — Linear copolyester. Good abrasion, UV-resistance, resiliency. Film, fiber. Goodyear.

759) p-XYLYLENE CHLORIDE — 95% min. LD₅₀ 2.9 g/kg. BP 140 @ 20mm. Int resins, plastics. Intro of benzene ring. Pennsalt.

760) m-XYLENE DIAMINE - ADIPIC ACID POLYMER — 97%. Similar to nylon 66. Oronite MXD-6.

761) m-XYLENE DIISOCYANATE — 99%. BP 143 at 4 mm. UV stable polyurethanes. Oronite MXDI.

762) p-XYLYLENE GLYCOL — 95% min. LD₅₀ 3.6 g/kg. MP 115-117.6. Int resins, plastics. Intro benzene ring. Pennsalt.



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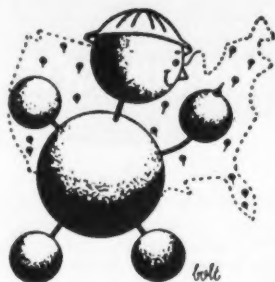
CHEMICAL PROCESSING

Use this list for locating . . .

CHEMICAL MANUFACTURERS

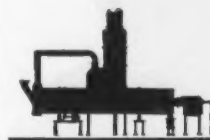
Here are full names and addresses of manufacturers of chemical materials described in listings starting on pages 52 and 79. Use this directory when contacting them about their products.

OR IF YOU PREFER . . . use Reader Service Slip opposite last page of this issue. Check number given before name of company making listed product which interests you. We'll contact manufacturer for you. Information will come direct to you.



- 100—Aceto Chemical Co., Inc., 40-40 Lawrence St., Flushing, L. I., New York
- 101—Acheson Colloids Company Div., Acheson Industries, Inc., Port Huron, Mich.
- 102—Advance Solvents & Chemical Div., Carlisle Chemical Works, Inc., New Brunswick, New Jersey
- 103—Air Reduction Chemical Co., 150 E. 42nd St., New York 17, New York
- 104—Alframine Corporation, 72-76 Putnam St., Paterson 4, N. J.
- 105—Allied Chemical Corporation, General Chemical Div., 40 Rector St., New York 6, N. Y.
- 106—Allied Chemical Corporation, National Aniline Division, 40 Rector St., New York 6, N. Y.
- 107—Allied Chemical Corporation, Nitrogen Div., 40 Rector St., New York 6, N. Y.
- 108—Aluminum Company of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa.
- 109—American Alcolac Corporation, 3440 Fairfield Rd., Baltimore 26, Md.
- 110—American Cholesterol Products, Inc., Talmadge Rd., Edison, New Jersey
- 111—American Cyanamid Company, 30 Rockefeller Plaza, New York 20, N. Y.
- 112—Ansul Chemical Co., 1 Stanton St., Marinette, Wis.
- 113—Antara Chemicals, Sales Division of General Aniline & Film Corp., 435 Hudson Street, New York 14, N. Y.
- 114—Arapahoe Chemicals, Inc., 2800 Pearl St., Boulder, Colo.
- 115—Argus Chemical Corp., 633 Court St., Brooklyn 31, N. Y.
- 116—Atlas Powder Company, Wilmington 99, Del.
- 117—Baker Castor Oil Co., 40 Ave. A, Bayonne, N. J.
- 118—Barnebey-Cheney Co., Cassady at Eighth, Columbus 19, Ohio
- 119—Barrett Div., Allied Chemical Corp., 40 Rector St., New York 6, N. Y.
- 120—Becco Chemical Div., Food Machinery & Chemical Corp., 34 Sawyer, Buffalo 7, N. Y.
- 121—The Borden Company, Chemical Div., 930 Lincoln Blvd., Middlesex, N. J.
- 122—Brown Company, Berlin, New Hampshire
- 123—Godfrey L. Cabot, Inc., 38 Memorial Dr., Cambridge 42, Mass.
- 124—Callery Chemical Company, 9600 Perry Highway, Pittsburgh 37, Pa.
- 125—Carbola Chemical Co., Inc., Natural Bridge, N. Y.
- 126—Cargill Inc., 200 Grain Exg., Minneapolis, Minn.
- 127—Carlisle Chemical Works, Inc., Reading, Ohio
- 128—The Carolina Aniline & Extract Company, PO Box 2386, Charlotte 1, N. C.
- 129—The Carwin Company, Stiles Lane, North Haven, Conn.
- 130—Catalin Corp. of America, 1 Park Ave., New York 16, N. Y.
- 131—Catalysts and Chemicals, Inc., PO Box 86, Louisville 1, Ky.
- 132—Ciba Company Inc., Plastics Div., Kimberton, Pa.

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CHEMICAL MATERIALS

- 133—Celanese Corporation of America, 180 Madison Ave., New York 16, N.Y.
- 134—Chemactants, Inc., Talmadge Rd., Edison, N. J.
- 135—Chemical Process Co., 1901 Spring St., Redwood City, Calif.
- 136—Chemstrand Corporation, Decatur, Alabama
- 137—City Chemical Corp., 132 W. 22nd St., New York 11, N. Y.
- 138—Claremont Pigment Dispersion Corp., 39 Powerhouse Rd., Roslyn Heights, L. I., N. Y.
- 139—Climax Molybdenum Company, Division, American Metal Climax, Inc., 500 Fifth Avenue, New York 36, N. Y.
- 140—Colton Chemical Co., a Div. of Air Reduction Co., Inc., 1747 Chester Ave., Cleveland 14, Ohio
- 141—Columbia-Southern Chemical Corporation, subs. of Pittsburgh Plate Glass Co., 632 Fort Duquesne Blvd., Pittsburgh 22, Pa.
- 142—Continental Oil Co., 1270 6th Ave., New York 20, N. Y.
- 143—Cosden Petroleum Corp., PO Box 1311, Big Spring, Texas
- 144—Cowles Chemical Company, 7016 Euclid Ave., Cleveland 3, Ohio
- 145—Croda Inc., 15 E. 26 St., New York 10, N. Y.
- 146—Crown Zellerbach Corporation, Chemical Products Div., Camas, Washington
- 147—Darling & Company, 4201 S. Ashland, Chicago 9, Ill.
- 148—Dewey and Almy Chemical Co., Div. of W. R. Grace & Co., Cambridge, Mass.
- 149—Diamond Alkali Company, 300 Union Commerce Bldg., Cleveland 14, Ohio
- 150—The Dow Chemical Company, Midland, Mich.
- 151—Dow Corning Corporation, Midland, Mich.
- 152—E. F. Drew & Co., Inc., 15 E. 26th St., New York 10, N. Y.
- 153—E. I. du Pont de Nemours & Company, Electrochemicals Dept., Wilmington 98, Del.
- 154—E. I. du Pont de Nemours & Company, Grasselli Chemicals Dept., Wilmington 98, Del.

For More Information . . .

. . . you may use Reader Service Slip opposite last page of this issue instead of writing direct to manufacturer. Check number given before name of company making listed product which interests you.

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CHEMICAL PROCESSING

- 155—E. I. du Pont de Nemours & Company, Polychemicals Dept., Wilmington 98, Del.
- 156—Dura Commodities Corp., 20 Vesey St., New York 7, N. Y.
- 157—Eastman Chemical Products, Inc., subs Eastman Kodak Company, Kingsport, Tenn.
- 158—Electro Metallurgical Co., Div. Union Carbide Corp., 30 E. 42nd St., New York 17, N.Y.
- 159—Emery Industries, Inc., 4200 Carew Tower, Cincinnati 2, Ohio
- 160—Emulsol Chemical Corporation, div. of Witco Chemical Company, 75 E. Wacker Dr., Chicago 1, Ill.
- 161—Evans Chemetics, Inc., 250 E. 43 St., New York 17, N. Y.
- 162—Fine Organics, Inc., 206 Main St., Lodi, N. J.
- 163—Firestone Plastics Company, div. of The Firestone Tire & Rubber Co., PO Box 690, Pottstown, Pa.
- 164—Fisher Scientific Company, 711 Forbes St., Pittsburgh 19, Pennsylvania
- 165—Flintkote Co., 30 Rockefeller Plaza, New York 21, N. Y.
- 166—Food Machinery and Chemical Corp., Chemicals & Plastics Div., 161 E. 42nd St., New York 17, N. Y.
- 167—Fritzsche Brothers, Inc., 76 Ninth Ave., New York 11, N.Y.
- 168—Furane Plastics Inc., 4516 Brazil Street, Los Angeles 39, Calif.
- 169—General Electric Co., Silicone Products Dept., Waterford, N.Y.
- 170—General Mills, Inc., 2010 E. Hennepin Ave., Minneapolis 13, Minn.
- 171—Girdler Catalysts, Chemical Products Div., Chemetron Corp., Louisville, Ky.
- 172—The Goodyear Tire & Rubber Company, Akron 16, Ohio
- 173—Gulf Oil Corp., Petrochemical Dept., PO Box 1166, Pittsburgh 30, Pa.
- 174—Halocarbon Products Corporation, 82 Burlews Ct., Hackensack, N.J.
- 175—Hampshire Chemical Corp., Poisson Ave., Nashua, N. H.
- 176—Harchem Division, Wallace & Tiernan, Inc., 25 Main St., Belleville 9, N.J.
- 177—Hercules Powder Co., 900 Market St., Wilmington 99, Del.
- 178—Heyden Newport Chemical Corporation, 342 Madison Ave., New York 17, N.Y.
- 179—Hodag Chemical Corporation, 7247 N. Central Park Ave., Chicago 45, Ill.

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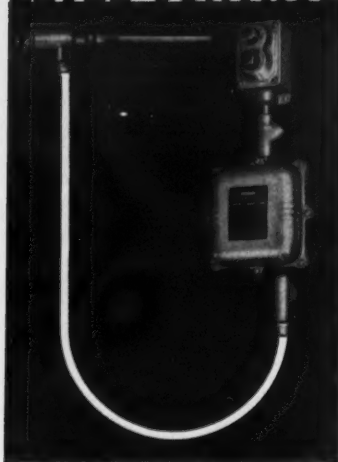
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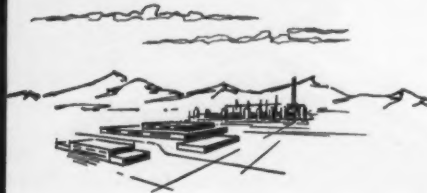
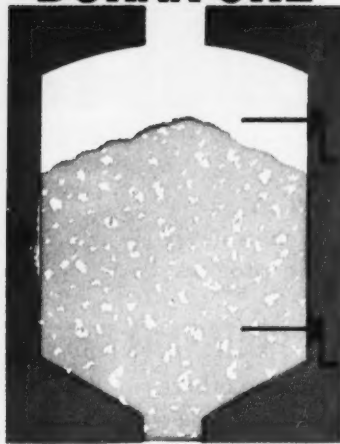
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- 180—Hooker Chemical Co., Niagara Falls, N.Y.
- 181—Houdry Process Corp., 1528 Walnut St., Philadelphia 2, Pa.
- 182—J. M. Huber Corp., 100 Park Ave., New York 17, N.Y.
- 183—Jefferson Chemical Co., Inc., 1121 Walker St., Houston 2, Texas
- 184—Jones-Dabney Company, 1481 South 11th St., Louisville 8, Ky.
- 185—Kenrich Corporation, 57-02 48 St., Maspeth 78, N.Y.
- 186—Kentucky Color and Chemical Co., 600 N. 34th St., Louisville 12, Ky.
- 187—Koppers Company, Inc., Pittsburgh 19, Pa.
- 188—Lucidol Division, Wallace & Tiernan Inc., 1740 Military Road, Buffalo 5, N.Y.
- 189—Mallinckrodt Chemical Works, Second and Mallinckrodt St., St. Louis 7, Mo.
- 190—Manganese Chemicals Corp., 1755 Rand Tower, Minneapolis, Minn.
- 191—Marathon, a division of American Can Co., Rothschild, Wis.
- 192—The Marblette Corporation, 37-31 30 St., Long Island City 1, N.Y.
- 193—Matheson Coleman & Bell, Div. Matheson Co., Inc., 2909 Highland Ave., Norwood, Ohio
- 194—Maumee Chemical Company, 2 Oak St., Toledo 5, Ohio
- 195—Metal & Thermit Corporation, 100 Park Avenue, New York 17, N.Y.
- 196—M. Michel and Company, Inc., 90 Broad St., New York 4, N.Y.
- 197—Michigan Chemical Corp., 500 N. Bankson Street, Saint Louis, Michigan
- 198—Minerals & Chemicals Corp. of America, Menlo Park, N. J.
- 199—Minnesota Mining & Mfg. Co., 900 Fauquier, St. Paul 6, Minn.
- 200—Mona Industries, Inc., Paterson 17, N.J.
- 201—Monsanto Chemical Co., Lindbergh and Olive St. Rd., St. Louis 24, Mo.
- 202—Mycalex Corp. of America, 125 Clifton Blvd., Clifton, N.J.
- 203—National Lead Co., 111 Broadway, New York 6, N.Y.
- 204—National Starch Products Inc., 750 Third Avenue, New York 17, N.Y.
- 205—Niagara Chemical Div., Food Machinery & Chemical Corp., Middleport, N.Y.
- 206—Nopco Chemical Company, First & Essex St., Harrison, N.J.

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CHEMICAL PROCESSING

CHEMICAL MATERIALS

- 207—Nuodex Products Company, Inc., Elizabeth, N.J.
- 208—Olin Mathieson Chemical Corporation, Industrial Chemicals Div., Mathieson Bldg., Baltimore 3, Md.
- 209—Olin Mathieson Chemical Corp., Organic Chemicals Div., 275 Winchester Ave., New Haven, Conn.
- 210—Onyx Oil & Chemical Co., 190 Warren St., Jersey City 2, N.J.
- 211—Oronite Chemical Company, 200 Bush Street, San Francisco 20, Calif.
- 212—Pennsalt Chemical Corporation, 3 Penn Center, Philadelphia 2, Pa.
- 213—Chas. Pfizer & Co., Inc., 630 Flushing Ave., Brooklyn 6, N.Y.
- 214—Phanstiehl Laboratories, Inc., 104 Lake View, Waukegan, Ill.
- 215—Phillips Petroleum Co., Special Products Div., Bartlesville, Okla.
- 216—Pitt-Consol Chemical Co., 191 Doremus Ave., Newark 5, New Jersey
- 217—Pittsburgh Coke & Chemical Company, Grant Bldg., Pittsburgh 19, Pa.
- 218—Quaker Oats Company, Merchandise Mart Plaza, Chicago 54, Ill.
- 219—Reheis Company, Inc., Berkeley Heights, N.J.
- 220—Reichhold Chemicals, Inc., 525 North Broadway, White Plains, N.Y.
- 221—Reynolds Metals Company, 2500 S. Third St., Louisville 1, Ky.
- 222—Rohm & Haas Company, Washington Square, Philadelphia 5, Pa.
- 223—Rubber Corporation of America, New South Rd., Hicksville, N.Y.
- 224—Schenectady Varnish Co., Inc., Congress & Ninth Sts., Schenectady 1, N.Y.
- 225—Schwarz Laboratories, Inc., 230 Washington St., Mount Vernon, N.Y.
- 226—Semet-Solvay Petrochemical Div. Allied Chemical Corp., 40 Rector St., New York 6, N. Y.
- 227—Shawinigan Resins Corporation, PO Box 2130, Springfield 2, Mass.
- 228—Shell Chemical Corporation, 50 West 50th Street, New York 20, N.Y.
- 229—The Sherwin-Williams Co., 11541 S. Champlain Ave., Chicago 28, Ill.
- 230—L. Sonneborn Sons, Inc., 300 4th Ave., New York 10, N.Y.
- 231—Spencer Chemical Co., Dwight Bldg., Kansas City 5, Missouri

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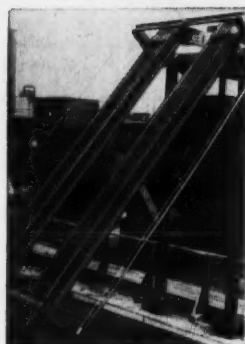
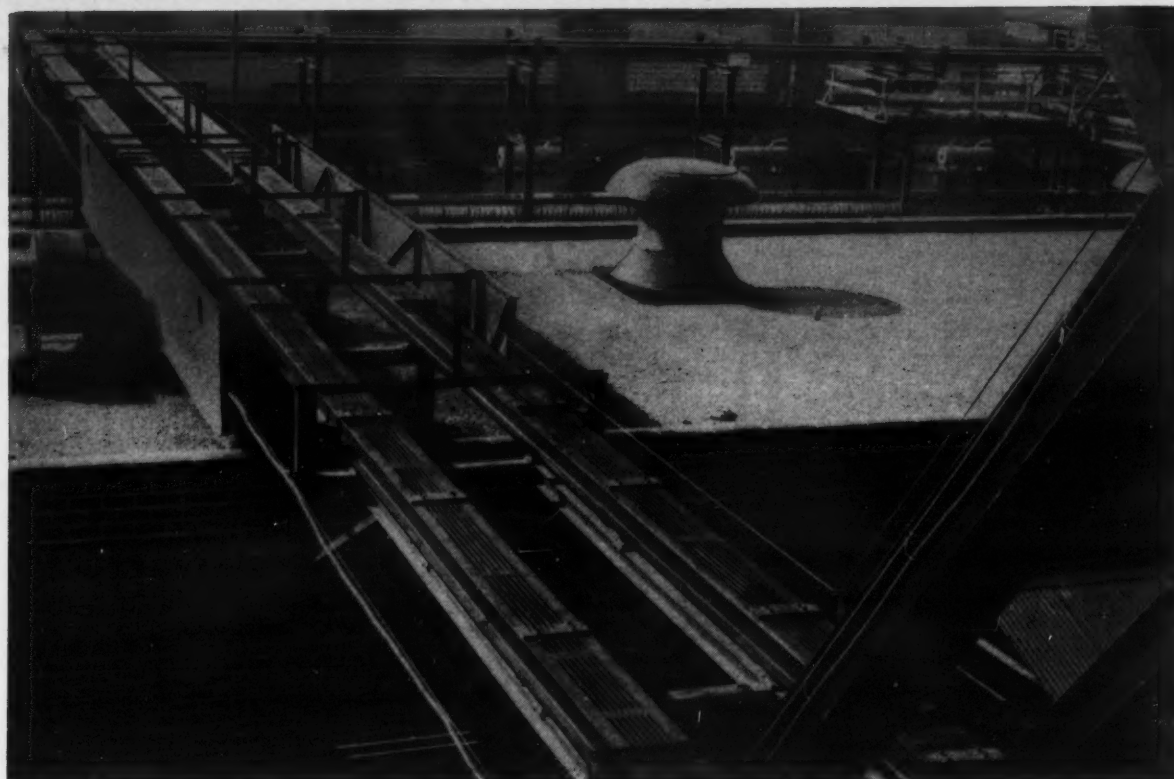
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Alcoa Aluminum Bus Serving Ethyl's Sodium-Chlorine Plant

To transmit 30,000 dc amperes at 550 volts from one rectifier station to another, at a circuit distance of 700 feet, Ethyl Corporation engineers weighed the facts, then chose lightweight, corrosion-resistant aluminum bus conductors. In considering conductors, they found three big advantages with aluminum: it cost less per foot of conductor; weighed about 50% less than copper of the same current-carrying capacity; and, as a result of this lighter weight, also reduced the cost of supporting structures for the system.

This is the second aluminum bus conductor installation by Ethyl. The performance of the first, as well as its economy, led to this second installation. The bus system serves sodium-chlorine electrolytic cells. The natural oxide film on the aluminum protects the bus from further corrosion. This protective film also improves the heat-radiating characteristics of the bus, permitting cooler operation or additional load-carrying capacity.

Savings also appeared during installation. Shielded arc consumable electrode welding, because of its flexibility and

speed, was used for the welded joints. Most of the welding was done on the ground where the supporting beams were assembled, facilitating installation and increased safety.

As in many industries, the electrochemical industry has found that bus systems of Alcoa® Aluminum are the modern answer to the need for economical power distribution. For complete information about Alcoa Bus Conductors, consult your local Alcoa distributor or sales office, or write to Aluminum Company of America, 2305-H Alcoa Building, Pittsburgh 19, Pennsylvania.



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- 234—Stein Hall & Co., Inc., 285 Madison Ave., New York 17, N.Y.
- 235—Summit Mining Corporation, Bashore Bldg., Carlisle, Pa.
- 236—Tennessee Corporation, Suite 500, 1330 W. Peachtree, Atlanta, Ga.
- 237—Tennessee Products & Chemical Corporation, 326 Union Street, Nashville 3, Tenn.
- 238—UBS Chemical Corporation, 491 Main St., Cambridge 42, Mass.
- 239—Union Carbide Chemicals Company, Div. of Union Carbide Corp., 30 E. 42nd Street, New York 17, N.Y.
- 240—Union Carbide Corporation, National Carbon Company, Div., 1300 Lakeside Ave., Cleveland 14, Ohio
- 241—Union Carbide Corporation, Silicones Division, 420 Lexington Avenue, New York 17, N.Y.
- 242—Universal Oil Products, 30 Algonquin Rd., Des Plaines, Ill.
- 243—U. S. Borax & Chemical Corp., 50 Rockefeller Plaza, New York 20, N. Y.
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- 245—Velsicol Chemical Corporation, 330 E. Grand Ave., Chicago 11, Ill.
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- 247—Warwick Chemical Company Div., Sun Chemical Corp., Wood River Junction, R.I.
- 248—Westvaco Mineral Products Div., Food Machinery & Chemical Corp., 161 E. 42nd St., New York 17, N.Y.
- 249—White Chemical Co., 1505 Capitol Ave., Bridgeport 4, Conn.
- 250—Wilson-Martin, Div. of Wilson & Co., Inc., Snyder Ave. & Swansen St., Philadelphia 48, Pa.
- 251—Witco Chemical Company, 122 E. 42nd St., New York 17, N.Y.
- 252—Wyandotte Chemicals Corporation, Wyandotte, Mich.

For More Information . . .

. . . you may use Reader Service Slip opposite last page of this issue instead of writing direct to manufacturer. Check number given before name of company making listed product which interests you.

Check 6561 opposite last page

Petrochemical towers —
window to the future

Although rapid strides have been made the past few years, the pace will quicken with production increases and new plants coming on stream that are expected to give the country a favorable balance of trade in organic chemicals as —

French Petrochemicals Look to the Future

ANDRE LOIZILLON, President-Directeur General
de la Societe Shell Saint-Gobain

In France today, petrochemicals are rapidly expanding and moving to the forefront of the entire chemical industry in spite of being a comparatively recent development dating back to scarcely 10

years ago. Present plans call for an increase in petrochemical plant investment from \$50 million in 1956 to \$290 million by the end of 1959.

Planned expansion in petrochemicals will be a major



factor in giving France a favorable balance of trade in organic chemicals. Whereas in 1956 France had a \$73 million unfavorable balance of trade in organic chemicals, by 1961 she is expected to have a \$67 million favorable trade balance.

Although closely intertwined with coal tar chemicals, it is nevertheless possible to place the development of petrochemicals within the framework of the general growth of the chemical industry.

If we take 100 as a base index for activity in the entire chemical industry for 1954, by 1961 this index should rise to 173 for the industry as a whole and to 247 for organic chemicals. By that time it is expected that 83% of all activity in organic chemicals will be accounted for by petrochemi-

cals as against 72% in 1956.

According to a forecast made by The Chemicals Commission for the 3rd Plan de Modernisation & d'Equipment, greatest petrochemical expansion will be in following products. Figures compare production in 1956 with that planned for 1961.

Ethylene will go from 22,500 to 119,000 tons. Production of synthetic rubber will be 70,000 tons as against none in 1956. Carbon black will go from none to 35,000 tons.

Plastics production will go from 128,000 to 335,000 tons. This will include PVC from 40,600 to 100,000—polystyrene from 12,100 to 40,000 — and polyethylene from 7000 to 70,000 tons. Sulfur should reach a tonnage of 1,200,000 as against 60,000 tons in 1956. This will place France in sec-



Andre Loizillon is well able to speak with authority on French petrochemicals — being Chairman of the Board of one of the largest petrochemical companies in France, the petrochemical pioneer, Shell Saint Gobain (an affiliate of Royal Dutch Shell and the Compagnie de Saint-Gobain) — as well as having had long and varied experience in the petroleum industry.

During his career, Mr. Loizillon spent five years constructing petroleum refineries in France with the Schneider organization. Later he joined Societe Jupiter (a subsidiary of Royal Dutch Shell in France). While with this group he made several visits to Roumania, where he was connected with Astra Romana, the Shell affiliate there.

Just before he assumed his present position, Mr. Loizillon was in charge of the Shell refinery at Berre l'Etang. He is a graduate of Ecole Polytechnique and the Ecole des Mines de Paris

French Petrochemicals

From preceding page

ond place as world producer of sulfur and leave an exportable margin of about 700,000 tons.

A significant boost in sulfur production and other petrochemicals was provided by the discovery and exploitation of a natural gas deposit at Lacq in southwestern France. This deposit also furnishes raw materials used in the manufacture of many products such as ammonia, nitrogen and urea fertilizers, methanol, acetylene, acetaldehyde, propane and butane derivatives, and aromatics.

A large complex of petrochemical companies is developing in the Lacq area. One of these is SNPA (Societe Nationale des Petroles d'Aqui-

taine), which produces sulfur. Another one is Aquitaine Chimie or more properly, Societe des Produits Chimiques d'Aquitaine. It is jointly owned by Pechiney, Saint-Gobain, ONIA (Office National Industriel de l'Azote), and Pierrefitte. Products manufactured include ammonia, methanol, and acetylene. Another jointly owned company in the Lacq area is Azolacq, a subsidiary of ONIA and Pierrefitte. It manufactures nitrogen fertilizers.

Other Petrochemical Centers

Just as at Lacq, petrochemical activity is concentrated near raw material sources in

other areas of France. These locations are at the Basse Seine area in Normandy, at l'Etang de Berre on the Mediterranean and Atlantic coasts, and in northern France.

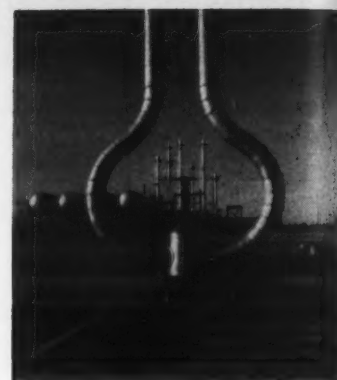
On the Atlantic coast at Donges, Antar Petroles de l'Atlantique recently began manufacturing aromatics, including paraxylene. In this area APEC (a subsidiary of Antar, Progil, and Uginé) produces cumene. Kuhlmann in Paimboeuf manufactures methanol and ammonia.

In the north we find Marles-Kuhlmann and Courrieres-Kuhlmann, both subsidiaries of Kuhlmann and Houilleres du Bassin du Nord. Plants here are making oxo alcohols, propylene oxide, and derivatives.

The most remarkable strides in the petrochemical development have been made in the Basse Seine area. Here complete petrochemical plants have been built around the refineries of Esso Standard at Port Jerome, Compagnie Francaise de Raffinage at Gonfreville, and Shell at Petit Couronne. Other petrochemical plants around refineries are in the Etang de Berre area where Shell and Naph-tachimie plants (Berre and Lavera) are located.

Esso Standard — already producing tetra propylbenzene for detergents — is building a new steam cracking plant with an input capacity of 230,000 tons per year. This plant will produce ethylene, propylene, butylene, and butadiene.

Ethylene from Esso will be used for the manufacture of polyethylene by two new companies — Ethylene Plastique-Normandie and Societe Normande de Matieres Plastiques. Isobutylenes will serve as the raw material for butyl rubber. This Esso plant will also supply hydrogen sulfide to Societe Nobel Bozel for the manufacture of sulfur.



Petrochemical plant in the Berre region

In the Lyons area the Rhone-Poulenc group is making phenol and acetone from cumene. Also, SIDA (Societe Industrielle des derives de l'Acetylene) produces C_3 and C_4 solvents. Pechiney and Progil are organizing a program for the manufacture of chlorine solvents in this area.

Detergents and Plastics

Refinery of CFR at Gonfreville will produce more than 50,000 tons per year of liquid and gaseous hydrocarbons. It will supply tetramen propylene to one of its subsidiaries, Petrosynthese (formed with the participation of Oronite Chemical and APEC) for the manufacture of dodecylbenzene for detergents. Initial 15,000 ton per year capacity of plant will be increased to 24,000 tons.

CFR refinery will supply ethylene to another subsidiary, Manolene (formed in association with Rhone-Poulenc and Kuhlmann) for the manufacture of polyethylene. Ethylene will also be supplied to Marles-Kuhlmann to make ethylene oxide. In addition, CFR will furnish raw materials to Orogil (formed by Progil and Oronite) for the manufacture of secondary ingredients of lubricating oils. Refinery will also furnish part of isobutylene required by SOCRABU company.

The pioneers of French petrochemicals, Shell Saint-Gobain (a subsidiary of Saint-Gobain and Shell) and Naph-tachimie (a subsidiary of Pechiney and BP), are located in the Berre region.

Shell Saint-Gobain manufactures a whole range of al-

FRENCH PETROCHEMICAL INSTALLATIONS



Principal petrochemical centers in France

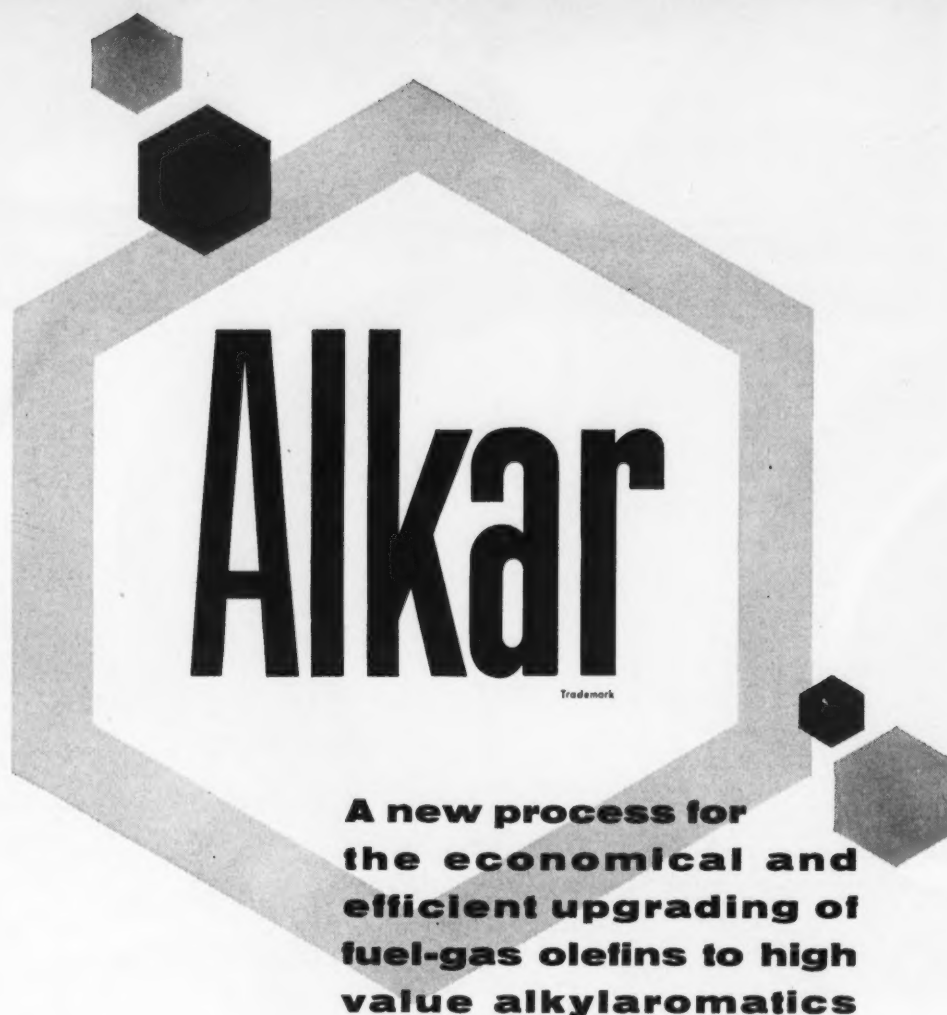
cohols and ethers derived from propylene and butylene. Synthetic resins marketed under the name Epikote are also made. Several production units to be opened in 1958 and 1959 are being constructed at present in the Berre area. This expansion program is principally concerned with making raw materials available for production of alkylate, oxo alcohols, and carbon black. Cabot-France (a subsidiary of Godfrey L. Cabot, Inc. of Boston) will produce 20,000 tons of carbon black in 1959.

Another petrochemical plant is operated by Shell Saint-Gobain at Petit Couronne near Rouen in the Seine Maritime department. This plant makes Teepol, a secondary alkyl sulfide. Since 1957 the plant at Petit Couronne has been expanded to include the manufacture of a new line of detergents under the name, Lensex. These products are made from petroleum raw materials. A series of technical improvements have made it possible to raise the capacity of the plant from 25,000 tons in 1951 to 35,000 tons of liquid detergent in a 21% solution.

The Naphtachimie Company — which at the present time produces ethylene oxide, glycol, and its derivatives, IPA and acetone — also has an ambitious program for future expansion. It is expected that production of ethylene will be increased to 50,000 tons per year and that propylene will be produced in the same amount. Manufacture of low-pressure polyethylene and butadiene is also planned.

This survey is an indication of the vitality of French petrochemicals. Companies in the petrochemical field look forward with confidence to the even greater opportunities that will be provided by the Common European Market.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip.



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**A new process for
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efficient upgrading of
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Alkar, now being made available to refiners by Universal Oil Products Company, provides the first economical means for the efficient use of ethylene without costly prior separation.

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Alkar is one of many UOP petrochemical and refining processes available to refiners everywhere. We will be glad to provide full information on this or any other UOP process without obligation.

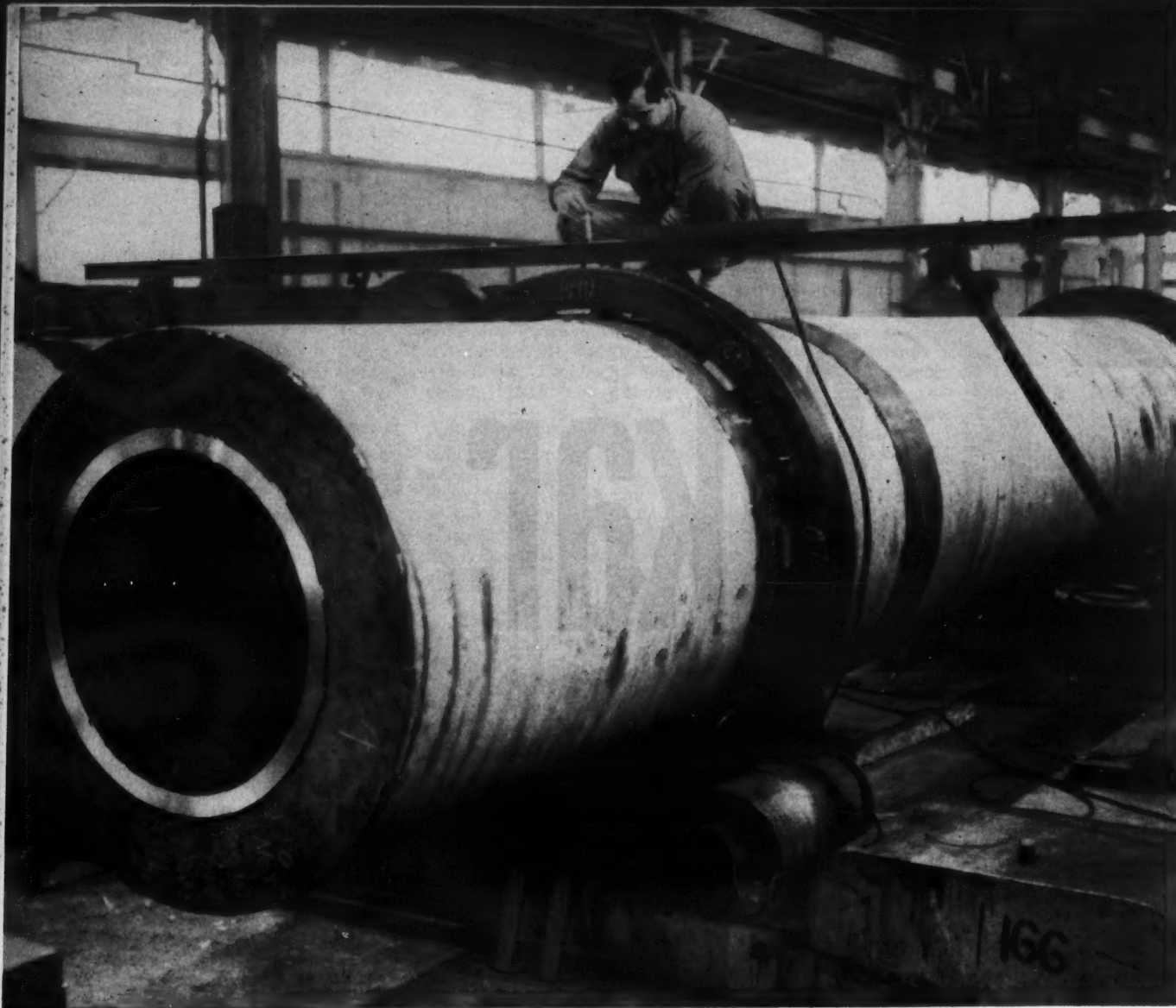


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PRODUCTS COMPANY**

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MORE THAN FORTY YEARS OF LEADERSHIP IN PETROLEUM REFINING TECHNOLOGY

Check 6562 opposite last page



1600° temperature dries salt in Stainless Steel

You're looking at a Stainless Steel rotary salt drier. It's used to de-moisturize salt, one step in making high octane gas.

C. O. Barlett & Snow Co., Cleveland, Ohio, built the drier with Stainless Steel because of all the materials tested, Stainless Steel stands up better under the tremendous heat—1600°F.—of the combustion gases used to dry the salt. And because Stainless is corrosion resistant, it can handle the salt, which has a moisture content as high as .5% when it's fed into the drier.

The salt comes out of the drier in a dry and free-flowing state. It's placed in electrolytic cells where it's reduced to chlorine, a by-product, and molten sodium, the ingredient for high octane gas.

Equipment designed for high heat and corrosion resistance wears better and lasts years longer when it's built with Stainless Steel. Specify Stainless Steel for your plant equipment. And if you want service-tested quality, specify USS Stainless Steel.

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WHAT DO YOU THINK?

Opinions and comments on the significant subjects carried in each month's petrochemical section are important! We welcome your letters expressing your views.

Many CP readers are taking the opportunity to state their views on today's top questions.

By publishing your letters in **CHEMICAL PROCESSING**, others will have the opportunity to hear your side.

Perhaps you agree

with what has been written in these articles.

Maybe you don't.

You might even have a thought or angle which wasn't expressed.

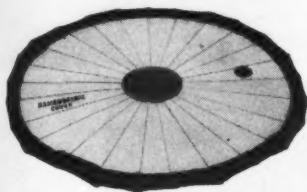
If so, why not let us and others hear your ideas? Suitable letters will be published in our regular "Letters from Readers" column.

Address your comments to:
The Editor
CHEMICAL PROCESSING
111 E. Delaware
Place, Chicago
11, Illinois.

**Plastic floating roof
cuts vapor losses
by 90%**

Uses: For application with vertical storage tanks up to 20' in diameter which store petrochemical solvents, gasoline, crude oil, and other products.

Features: Plastic cover is expected to provide the same conservation for small-diameter tanks that the floating roof has accomplished for large storage tanks. Evapora-



Cover consists of pie-shaped foam plastic segments, each with a foam neoprene edge seal

tion, breathing, and filling losses can be reduced at least 90% with the cover. Since it prevents the formation of vapor and exposure to air, cover retards corrosion, improves safety, and preserves product stability.

Description: Hamondflote cover is constructed of 18" radial sections of rigid polyisocyanate foam. Each section has a neoprene seal attached to its periphery. When all segments are assembled, neoprene loop provides an effective edge seal.

Cover has a density of only 3 lb/cu ft, which insures that it will remain afloat. Plastic has sufficient load carrying capacity so that the cover will support the weight of a man. Cover is resistant to hydrocarbons, water, and most chemicals. It will withstand temperatures in range of -94 to 300°F. It is spark-proof and flame resistant.

Cover can easily be installed by inserting segments through roof manhole and assembling while tank is in active service.

(Hamondflote cover is product of Hammond Iron Works, 744 Broad St., Newark 2, N.J.) Check 6563 opposite last page.



"B&W Tubing Met My Needs Exactly!"

"As a design engineer in the petroleum processing field, I'm interested in getting components which best meet all service conditions involved and offer the least difficulty in fabrication."

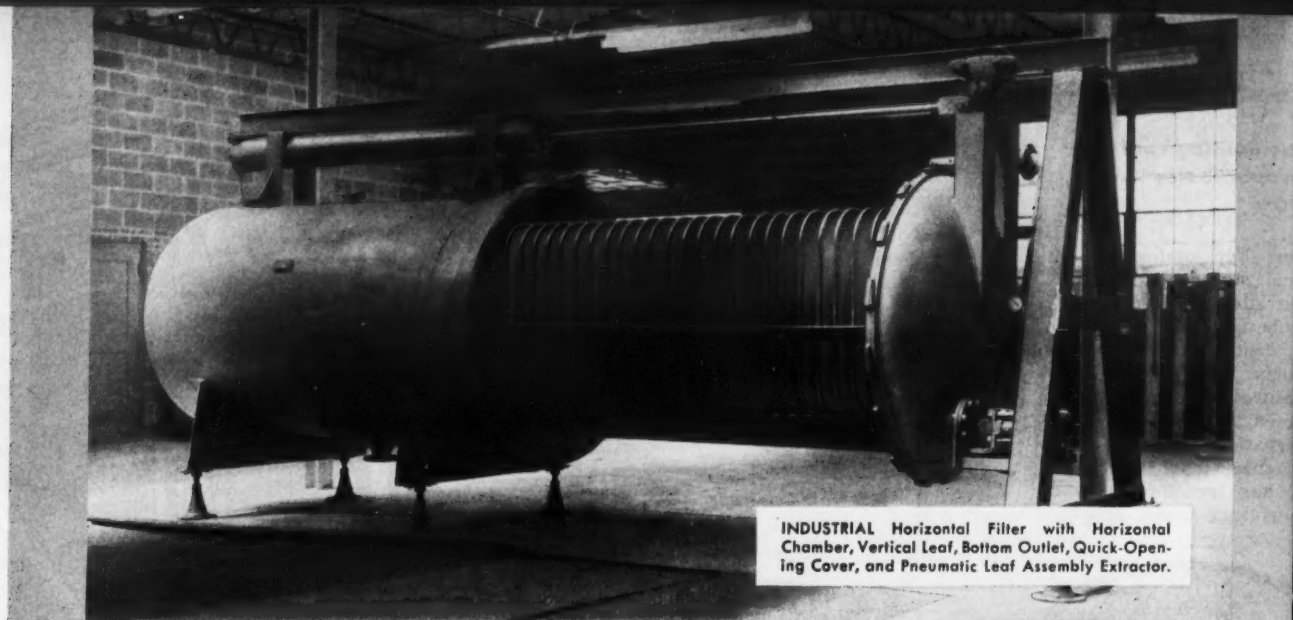
In a heater such as this, pressures, temperatures, oxidation, corrosion, strength and tube size were factors the design engineer had to consider. Tubes of various sizes and three grades of steel were specified for the job. The tubes were produced under B&W's rigid quality control procedures to meet anticipated service conditions and to provide ease of fabrication.

Engineers find it pays to specify B&W Tubing. It is available in such a broad range of grades, types and sizes in carbon, alloy and stainless steels that it can be matched to service and fabricating conditions. For information — call Mr. Tubes, your B&W sales representative, or write for bulletin TB-417. The Babcock & Wilcox Company, Tubular Products Division, Beaver Falls, Pa.

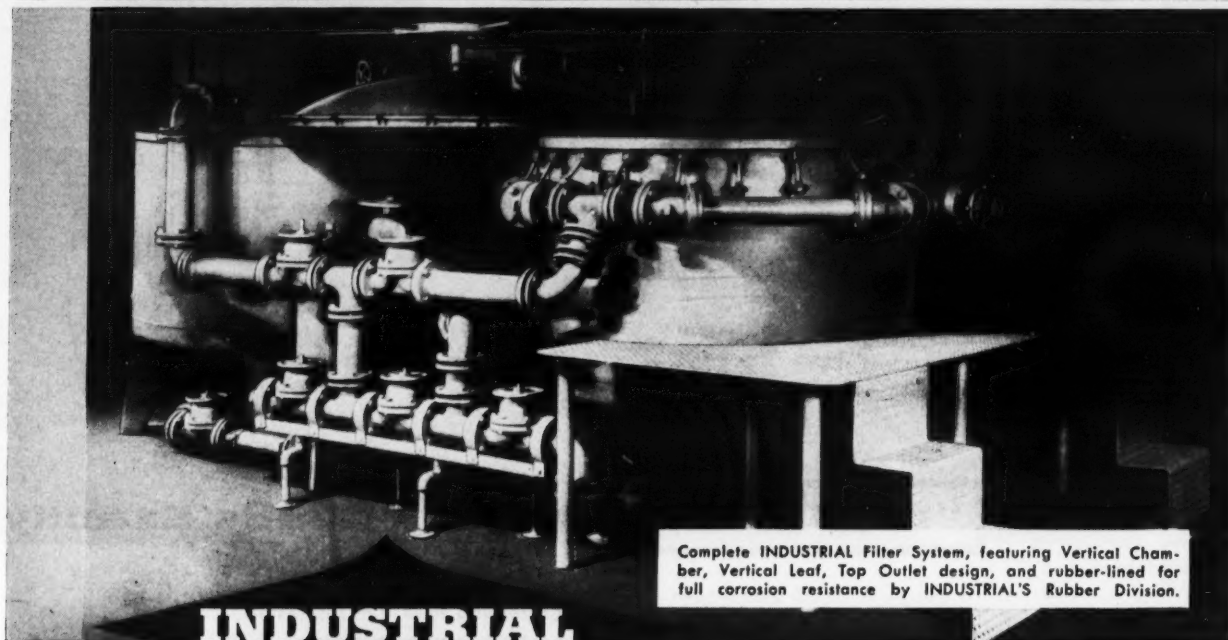
Seamless and welded tubular products, solid extrusions, seamless welding fittings and forged steel flanges—in carbon, alloy and stainless steels and special metals.



TA-8019-PP4



INDUSTRIAL Horizontal Filter with Horizontal Chamber, Vertical Leaf, Bottom Outlet, Quick-Opening Cover, and Pneumatic Leaf Assembly Extractor.



Complete INDUSTRIAL Filter System, featuring Vertical Chamber, Vertical Leaf, Top Outlet design, and rubber-lined for full corrosion resistance by INDUSTRIAL'S Rubber Division.

INDUSTRIAL

Engineered Filtration Equipment and Techniques to improve product quality—cut processing costs

Your process is different in some ways from any other. That's why—for highest product quality, operating simplicity, and economy—you need a filtration system built specifically for you. An INDUSTRIAL engineered system is exactly that.

INDUSTRIAL is more than a builder of filtration equipment—it's a specialized engineering service that makes available to you over 25 years of filtration experience and techniques. Our engineers and chemists will work with you to develop a system which takes into consideration all the factors vital to your specific operation—type of slurry, filter design, cake recovery, cleaning, piping, auxiliary apparatus, and controls. At

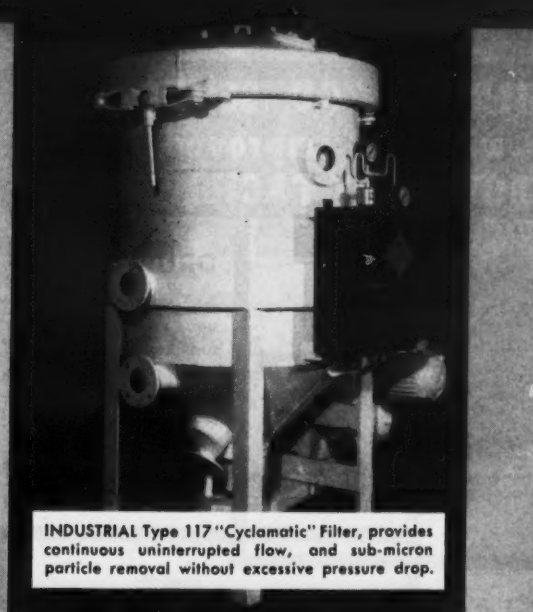
INDUSTRIAL'S Testing Center, there are complete facilities for pilot plant study of any system, ready to be put to work for you.

Remember, too, that INDUSTRIAL produces a full range of filter types and sizes—and can therefore recommend, without partiality, a filter most suitable for your needs. A wide variety of cost-saving optional features are also available. And all systems are adaptable to full or partial automation.

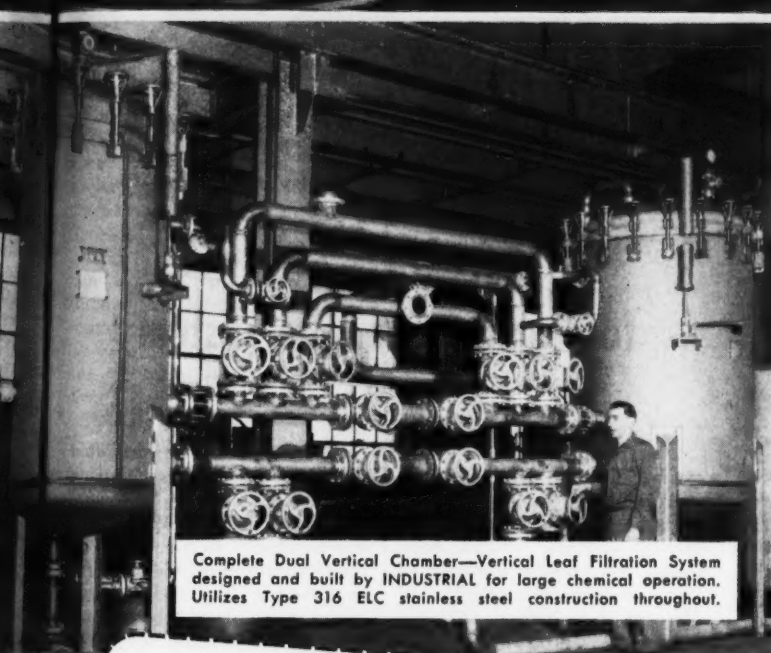
Call or write INDUSTRIAL to find out how properly-engineered filtration equipment and techniques can improve product quality and cut processing costs.



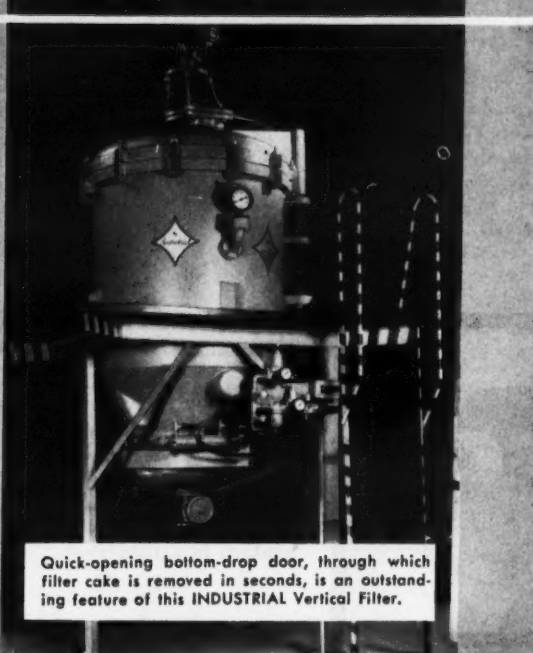
INDUSTRIAL Type III Vertical Filter in petrochemical service. Features Vertical Chamber, with Vertical Leaves and Bottom Outlet.



INDUSTRIAL Type 117 "Cyclomatic" Filter, provides continuous uninterrupted flow, and sub-micron particle removal without excessive pressure drop.



Complete Dual Vertical Chamber—Vertical Leaf Filtration System designed and built by INDUSTRIAL for large chemical operation. Utilizes Type 316 ELC stainless steel construction throughout.



Quick-opening bottom-drop door, through which filter cake is removed in seconds, is an outstanding feature of this INDUSTRIAL Vertical Filter.

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Here, your process conditions can be duplicated and studied—to help you select the most suitable filtration system, without disturbing your production. This Center includes all types of pressure filters and auxiliary equipment—all interconnected by an ingenious valve and piping system. Comparative data on variations is obtained in minutes, instead of days of costly experimentation in your own plant.

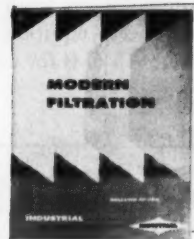
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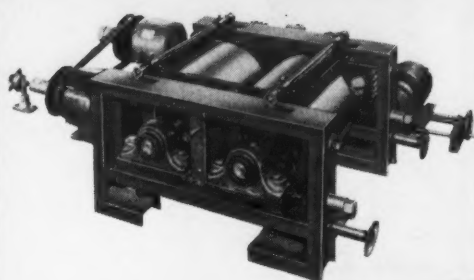


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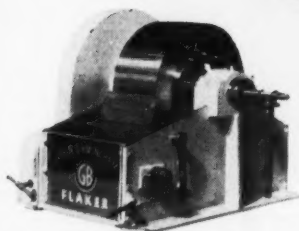
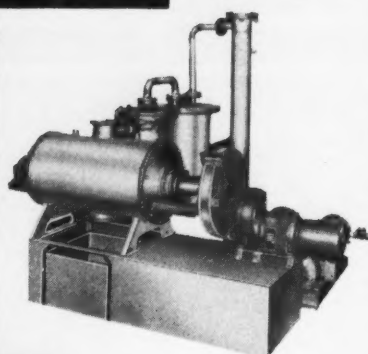


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These pilot scale units, available in our laboratory, provide the means to investigate your process equipment problems and demonstrate performance. Consult G-B for assurance of proper equipment selection.

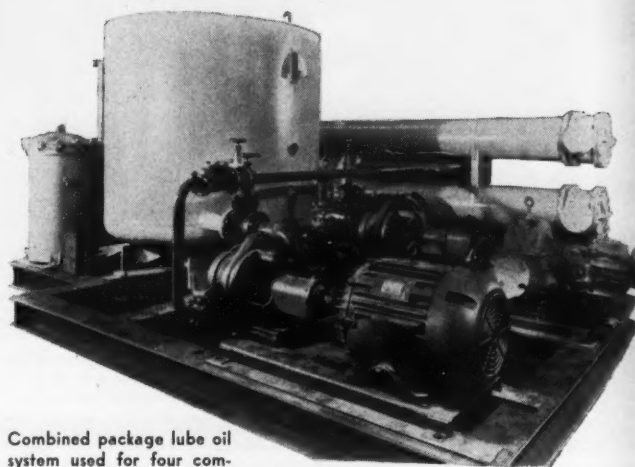


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CONTRACT MANUFACTURING
including **HEAVY CASTINGS**

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PETROCHEMICALS



Combined package lube oil system used for four compressors and their drivers at Texas Butadiene

At butadiene plant in the Southwest — simplified installation, space saving, and reduced maintenance are advantages of combined package unit that —

Cuts costs 50%
for compressor lube system

A combined package lubrication unit — which serves two axial and two centrifugal compressors and their steam-turbine drivers — has been found to offer a number of money-saving advantages over conventional method of using a separate lube system for each compressor and driver. At the Lyondell plant of Texas Butadiene & Chemical Corp. near Houston, two such packaged systems have given efficient, economical service during the more than one year they have been in operation.

Among advantages found for lube system at this plant are fewer components, lower equipment costs, less time for installation, reduced downtime and maintenance costs — and a neater, space-saving arrangement.

Combined package lube system was feasible for this plant since the Houdry butadiene process used requires that all four compressors in one ar-

rangment must be operated simultaneously except during startup. Combined lube system fills the first need and has the flexibility to meet the latter requirement. Two lube systems at Texas Butadiene serve a total of eight compressors and their drivers.

Four compressors served by one lube system at the plant include one five-stage axial regeneration air compressor and three units which handle product gas. Compressors for product gas increase pressure of effluent gas from reactors to 160 psia. Comprising the latter group are an eleven-stage axial compressor, a five-stage centrifugal, and a three-stage centrifugal — operating in series.

Costs

Combined lubrication system costs only 1.95 times as much as a single system — yet takes the place of four. Hence, a cost reduction of

about 50% for equipment is achieved.

Separate package lube systems are mounted individually. Separate components are interconnected in the field. Both are time-consuming, costly procedures. Central system has the components mounted and completely assembled with interconnecting piping at the factory. Only input and discharge connections had to be made in the field for oil, water, and steam lines. Also, only one baseplate is used and less grouting is needed.

Combined lube system takes only about 35% of the space required for four separate systems. Neatness, accessibility, and larger capacity without prohibitive increase in size of components are other advantages obtained. Fewer parts lower maintenance and lessen probability of a plant shutdown due to equipment malfunction.

Central lube system has a number of well-thought-out engineering features that decrease possibility of failure, increase flexibility, and permit cleaning without shutdown.

Two lube systems in use at Texas Butadiene have done a good job in supplying oil in the correct quantities and at the required pressure to satisfy demands of bearings, turbine governors, and valves.

(Compressor installation was engineered by The Fluor Corporation, 2500 S. Atlantic Blvd., Los Angeles, Calif.)

(Combined package lube system, furnished with compressors, is product of Allis-Chalmers Mfg. Co., PO Box 512, Milwaukee 1, Wis.)

Check 6567 opposite last page.

Non-lubricated compressor

Manufacturer's flier describes non-lubricated compressor for heavy-duty service where the air or gas being compressed cannot be allowed to contact oil or other lubricants. Form 3251 — Ingersoll-Rand Co., 11 Broadway, N. Y. 4, N. Y.

Check 6568 opposite last page.

POTENTIAL

... here's *full* potential for oil refineries, chemical and heavy industrial plants, because ...

FABRICATION ... of all types of equipment (*Fractionating Columns, Gas Columns, Pressure Vessels, Plate and Heavy Steel Work, Special Machines, Autoclaves, Shells, Base Bridge Girders*) ... is performed to order ... to specification.

MACHINING ... fully equipped, flexible facilities for machining to close tolerances, regardless of product size or design.

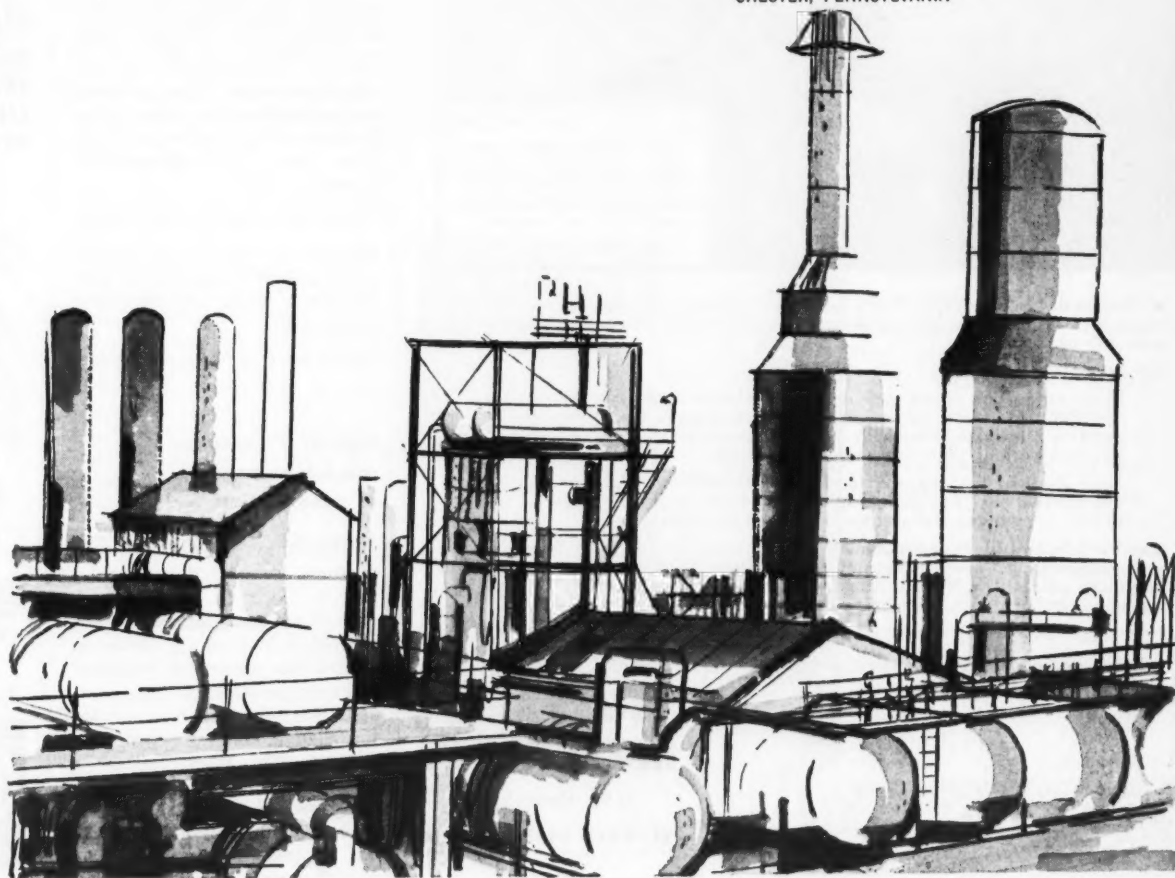
STAINLESS ... separate, integrated shop for stainless fabrication protects against contamination by ordinary steel.

DELIVERY ... by rail, truck or inland, coastal or overseas waterway.

Through integrated, efficient operation, Sun Ship can reduce costs ... increase your **POTENTIAL**. Call for an estimator or representative.

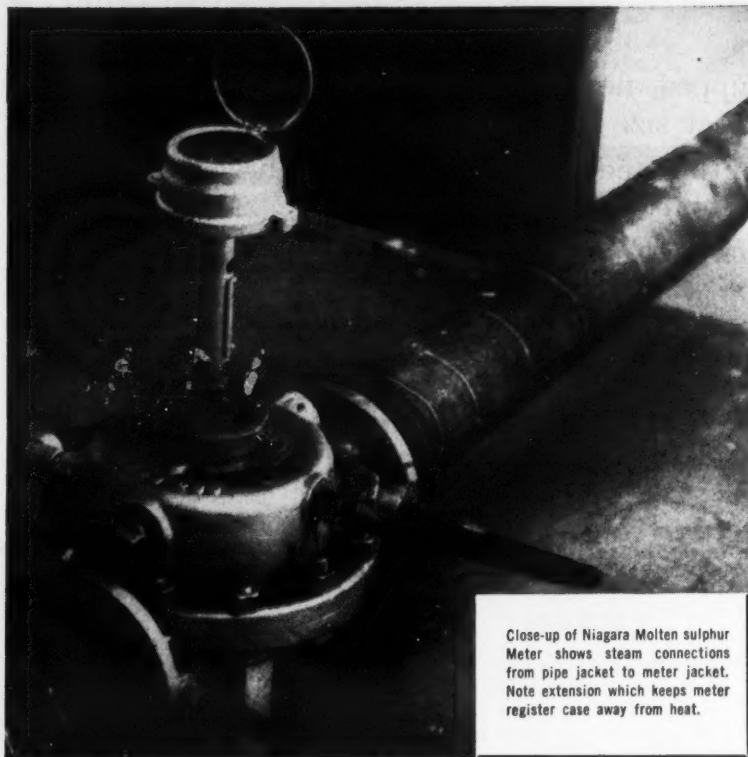
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CHESTER, PENNSYLVANIA



Check 6569 opposite last page

For the difficult Liquid Metering Problems Use Niagara Meters



Close-up of Niagara Molten sulphur Meter shows steam connections from pipe jacket to meter jacket. Note extension which keeps meter register case away from heat.

● Niagara displacement type liquid meters have a surprising range of applications. Their ultra-simple design, and variations of materials enable them to operate under most difficult conditions.

For example:

In the production of sulphuric acid it is desirable to measure the amount of sulphur fed to the burners so that the efficiency of the process can be checked. A Niagara Meter with a steam-jacketed cast iron casing and stainless steel working parts was selected for the job.

Since April of 1955 more than two million gallons of lime neutralized and filtered, dark Louisiana sulphur have been metered at a rate of 560 G.P.H. . . . without a shutdown for repairs or maintenance.

There is a dependable Niagara Meter to meter almost every liquid including caustic soda, sulphuric acid, soap, petroleum products, fruit juices, calcium chloride, alum and many others. The Niagara water meter line is standard for cold or hot water measurement.

Please send me information on Niagara Chemical Meters.

Liquid.....
Flow g.p.m.....Temp.....
Name.....
Company.....
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BUFFALO METER CO.

2892 Main Street
BUFFALO 14, NEW YORK

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PETROCHEMICALS

Anti-corrosive coating on 850 tons of pipe for Venezuela plant

Some 850 tons of pipe for use in an off-shore gas plant in Lake Maracaibo, Venezuela, was given an anti-corrosive zinc coating recently in Houston, Texas. The big spraying operation involved approximately 1100 pieces of pipe ranging in size from 4 to 42" outside diameter.

In the coating treatment, the exterior of the pipe was first sandblasted to a "white metal" finish to remove all rust, mill scale, and other foreign matter. It was then sprayed with Dimetecote No. 3 zinc coating to a thickness of 2 to 3 mils. The finish was then "cured" through spray application of another chemical material.

Coating is expected to last a long time without need for maintenance. A Galveston Bay installation with a similar coating has withstood corrosive attacks for the last seven years without failure.

(Anti-corrosive pipe coating was performed by Atlas Metal Protection Inc., a div. of Atlas Pipe Inc., 7707 Wallisville, Houston, Tex.)

Check 6571 opposite last page.

(Dimetecote No. 3 is product of Amercoat Corporation, 4809 Firestone Blvd., South Gate, California.)

Check 6572 opposite last page.

Chemical engineer can lower costs of construction

Should know types of contracts, details of project

In the construction of new petrochemical and chemical plants, the chemical engineer is in a position to cut construction costs through proper knowledge and approach to a project. To start with, he should be familiar with various types of contracts in order to see which would be best for his project. Type of contract will have an important bearing on the success as well as



Key TO TOP QUALITY and SERVICE

Catalog A-7

FOR COMPLETE
INFORMATION

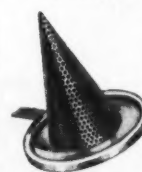


MAC-IRON

**BLINDS, SPACER RINGS,
TEMPORARY STRAINERS,
LINE STRAINERS, and
PIVOT FLANGES . . .**

This comprehensive booklet is your guide to the use of specialized equipment planned and produced to function with extreme efficiency. Detailed specifications, descriptions, and data are included.

In the years of supplying to the Petro-Chemical Field MAC-IRON has developed a design and production service to a degree seldom equalled. If confronted with an emergency or tight schedule, PHONE US. If not in stock, the equipment you need will be made up at once.



Your inquiry will promptly bring a copy of Catalog A-7 or specific engineering data. PHONE MAIN 6-3712 FOR IMMEDIATE PRODUCTION OR CONSULTATION SERVICE.

**"If YOU USE PUMPS
You need MAC-IRON Strainers"**



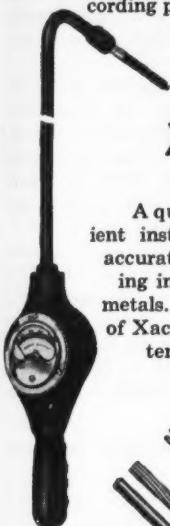
Check 6573 opposite last page
CHEMICAL PROCESSING

PRECISION TEMPERATURE measurement and control



GORDON XACTLINE

Controls temperature automatically within a fraction of a degree in any heat process. A complete factory-assembled unit ready for installation anywhere. Can be used with any existing indicating or recording pyrometer controller—regardless of age.



GORDON XACTEMP Hand Pyrometer

A quality-built, convenient instrument for quick, accurate temperature reading in molten nonferrous metals. Also, other models of Xactemp for all-around temperature checking.

GORDON SERV-RITE

Thermocouple Wire
Thermocouple Extension Wire

Insulated in Gordon's own plant to assure consistent quality. All standard wire and insulations carried in stock for quick delivery. Other wires, in long or short runs, manufactured to specifications.

Full Particulars on Request

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Manufacturers • Engineers • Distributors
Temperature Control Instruments • Thermocouples & Accessories • Industrial Furnaces & Ovens • Metallurgical Testing Machines

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2031 Hamilton Avenue, Cleveland 14, Ohio

Check 6574 opposite last page

PETROCHEMICALS

the cost of the contract. General type of contracts follow:

Incentive

Lump sum
Guaranteed max cost
Bonus variation of above

Non-incentive

Cost plus fee
Fixed fee

Determining the type of contract best suited to a project is itself a contribution to lower construction costs.

The chemical engineer should also be familiar with the contractor's approach to estimating costs. For example, for calculating cost of concrete, about 20 different items are considered. Process piping estimates involve an equal number. In each case, knowledge of these factors will improve working relationship with the contractor and help to lower costs. Chemical engineer can incorporate features of design and simplicity in such things as piping that will decrease costs. Models are of great value.

Other ways to save money are to develop good drawings and specifications, define scope of project well, and be prompt in communications.

(Condensed from technical paper, "The Chemical Engineer's Contribution to Lower Construction Costs", which was presented at the South Texas Section Meeting of the American Institute of Chemical Engineers on Oct. 18, 1957. Author of paper was R. C. Rohrdanz, Mgr. of Construction, Tellepsen Petro-Chem Constructors, div. of Tellepsen Construction Co., PO Box 2536, Houston, Texas.)

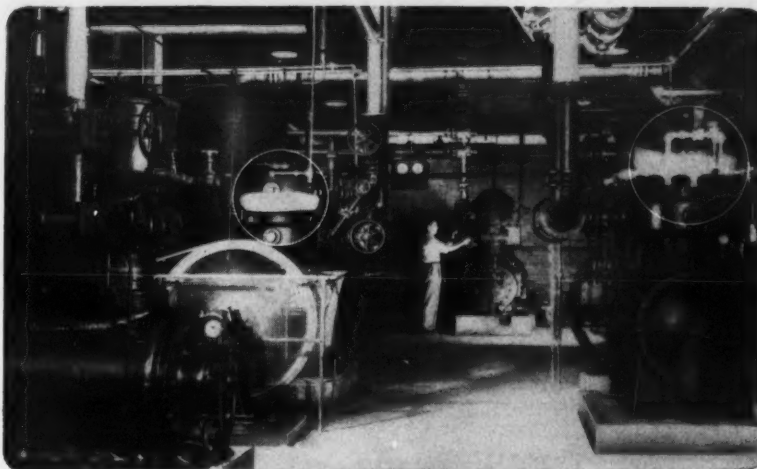
Check 6575 opposite last page.

Heating gases, liquids

Bulletin of eight pages on heating of gases, vapors, or liquids serves as convenient guide to aid engineers in analyzing advantages that result from use of indirect-fired heaters. Bul 587 — Brown Fintube Company, Elyria, Ohio.

Check 6576 opposite last page.

LOOK AT THOSE FROSTED JACKETS

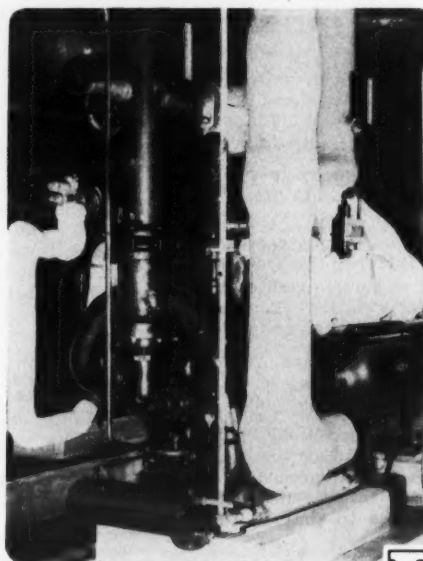


Two of five Frick booster compressors on a large low-temperature operation. All have cylinders cooled with direct-expansion ammonia. (Frick Patent No. 2,553,623)

They're a patented feature of Frick booster compressors . . . whereby the jackets are cooled with direct-expansion refrigerant.

These frosted jackets remove a tremendous amount of heat from the discharge of the compressor, and make the entire two-stage system operate with much higher efficiency.

Refrigerated jackets permit the cylinders to fill more completely, increasing the volume of gas pumped; they make the valves run cooler and causes lower compression temperatures. Better lubrication of valves and pistons results. The outlet connections from the jackets are carried to the suction of the second-stage machines.



Note the ammonia connections to cylinder jackets on this "ECLIPSE" booster, running at 1200 r.p.m., supplying low-temperature service.

Jackets cooled with refrigerant are much colder than those fed with water; also, the danger of freezing the water is avoided.

This highly efficient cooling system can be applied to staged refrigerating systems of any design, with any type compression equipment, using any refrigerant. It is protected by Frick Patent No. 2,553,623. The lower the temperature, the greater the savings—up to 20 per cent at minus 80 degrees. When you buy low-temperature refrigeration, insist on this important feature.

DEPENDABLE REFRIGERATION SINCE 1882
FRICK CO.
WAYNESBORO, PENNA., U.S.A.

Check 6577 opposite last page



No rewelding possible...

Job for Inco-Weld "A"... the electrode that handles most problem joints... and welds most dissimilar alloys, too

This welder is fabricating a 12-foot high stainless steel reaction vessel designed to operate at more than 1200°F.

Insulating jacket prevents weld repairs...

In service, this vessel is entirely covered by an insulating jacket. Permanent welds are a must to prevent lengthy delays for repairs.

The root pass was made with a stainless steel electrode matching that of the vessel. But then the problem started. Toronto Copper-smithing engineers wanted to avoid heat treating the vessel after welding to remove weld brittleness. The welds had to be strong enough to withstand 1200°F. and be unusually ductile.

Inco-Weld "A" Electrode produces strong, sound, ductile welds

After a series of tests, they found Inco-Weld "A"* Electrode could be depended upon to produce the high quality welds needed without special procedures. What's more, the deposits made with this electrode have a coefficient of expansion close to that of the

stainless steel — an important advantage when operating temperatures soar to 1200°F!

What's your joining problem?

Try a few tests with versatile Inco-Weld "A"† Electrode, the electrode with the distinctive green flux, for welding dissimilar alloy combinations, or Inco-Weld "A" Wire — the new inert-gas metal-arc wire just introduced. Both produce high quality welds between ferritic and austenitic stainless steel, low alloy and mild steel, high nickel and other alloys.

Get this new booklet

"Now You Can Weld Dissimilar Alloys Easily" includes case histories on problem welds solved and results on test data compiled on dissimilar alloy combinations. Send for your copy.

*Trademark, The International Nickel Company, Inc.
†Formerly sold as Inco-Rod "A" Electrode.

THE INTERNATIONAL NICKEL COMPANY, INC.

67 Wall Street



New York 5, N. Y.

INCO WELDING PRODUCTS
electrodes • wires • fluxes



Check 6578 opposite last page

PETROCHEMICALS

Catalog covers flanges, gaskets, welding fittings

Cloth-bound, 136-page, illustrated booklet contains complete information on line of flanges, ring-joint gaskets, and seamless welding fittings. Inspection and testing procedures which insure high-quality products are discussed. Detailed specifications for each item are given.

Five sections on flanges include forged steel flanges, seamless long-neck type, orifice flange unions, API flanges, and reducing flanges. Present edition of catalog carries 150-lb to 2900-lb forged steel flanges although 125-lb are available.

Included in section on ring-joint gaskets is threading practice for American Standard Flanges. Appendix contains valuable data on tolerances, conversion tables, and other information.

For convenience of companies outside the United States, a special edition is now being prepared in which measurements will be in the metrical system. Cat 40 — OTM Corp., PO Box 19296, Houston, Texas.

Check 6579 opposite last page.

Selecting oil for rubber

How to select an oil for compounding and extending butadiene-styrene polymers is covered in company bulletin. Oil for rubber bul — Industrial Products Dept., Sun Oil Company, 1608 Walnut St., Philadelphia 3, Pa.

Check 6580 opposite last page.

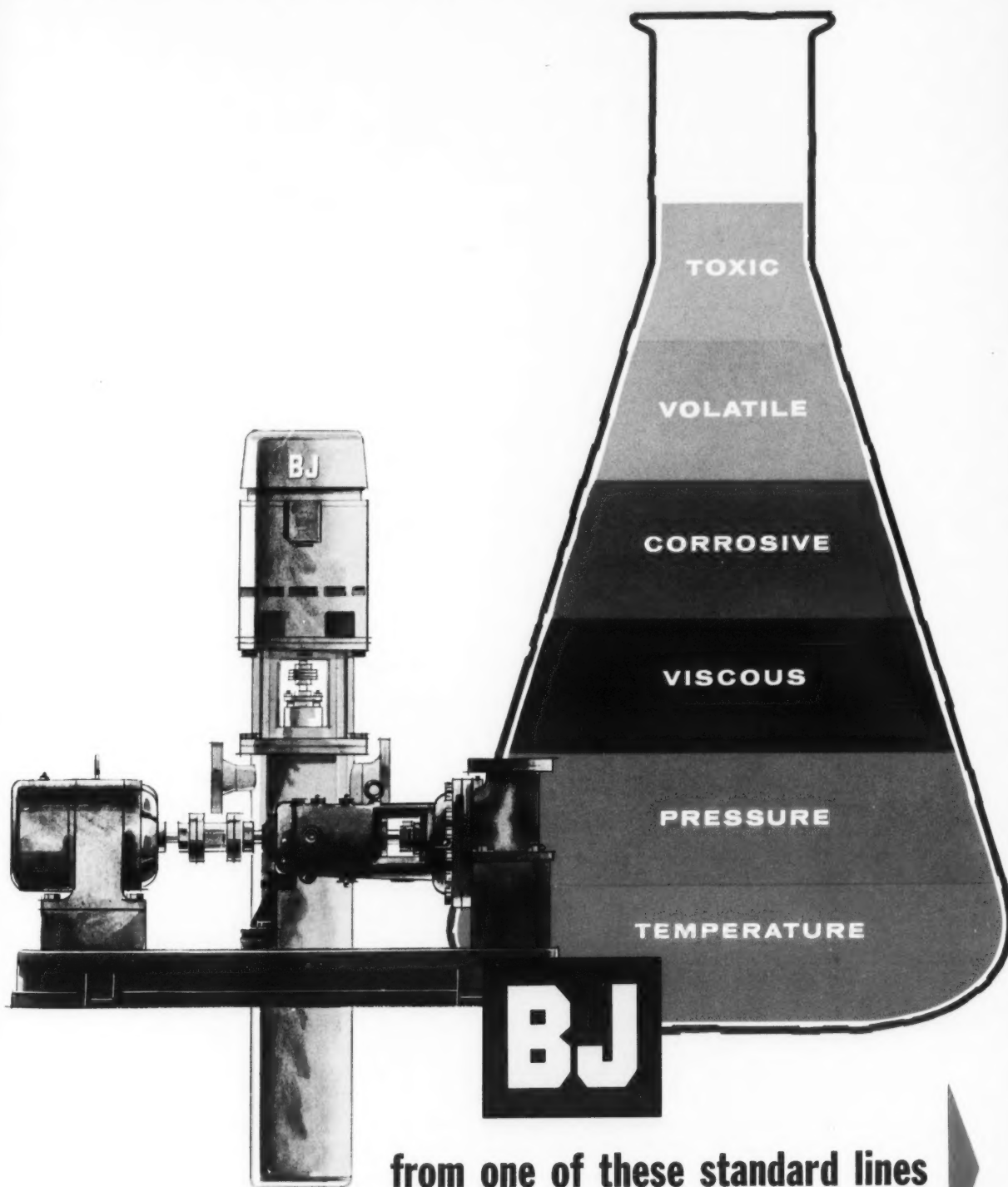
Compressor bulletin

Detailed information on heavy-duty high-pressure stationary compressors is contained in eight-page bulletin. Specifications on four basic models which range in capacity from 368 to 2000 cfm are included. Bul A-93 — Joy Manufacturing Co., Oliver Bldg., Pittsburgh 22, Pennsylvania.

Check 6581 opposite last page.

Name your toughest pumping job...

BJ CAN MATCH IT WITH A RELIABLE PUMP!

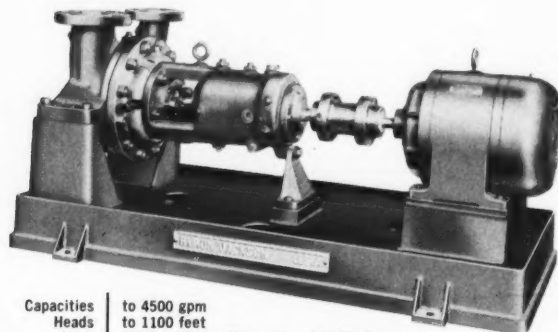


from one of these standard lines

BJ Standard Pumps—engineered to your process handling requirements!

WHILE RELIABILITY is the most important single feature demanded in a process pump, operating conditions are often the most rugged. Extremes of high or low temperature... corrosive, toxic and volatile fluids are encountered.

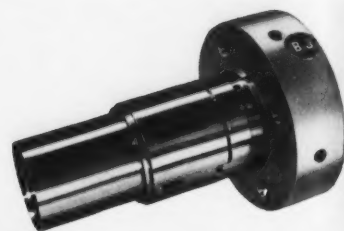
As part of Byron Jackson's complete line of centrifugal pumps, the models shown here were designed especially for different process pumping conditions. *All are available with the BJ Mechanical Seal for dependable, top performance.*



Capacities	to 4500 gpm
Heads	to 1100 feet
Sizes	1½" — 12" suction 1" — 10" discharge
Temperatures	— 320°F to 800°F

SM PROCESS PUMPS

Developed for handling fluids over a wide range of pressures and temperatures. Basically a single stage, single suction horizontal pump, the SM Series is designed for continuous operation with easy dismantling for inspection or service. Ideal for pumping hot or cold liquids near vapor pressure... for corrosive or non-corrosive service. Two stage, as well as double suction models available... also models with integrally-built BJ Mechanical Seals.



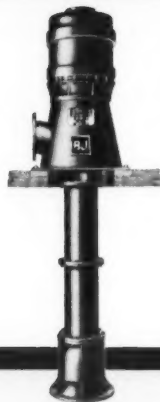
BJ MECHANICAL SEAL

Replaces standard stuffingbox packing. Eliminates excessive leakage, frequent repacking and shaft sleeve replacement. Materials and construction combinations for almost any corrosion, pressure, temperature or liquid handling need. Since BJ manufactures both mechanical seals and pumps, you are assured of a completely reliable process pump from a single, responsible source.

VMT PUMPS

Mounted in a self-contained suction sump, ideal for use where net positive suction head is limited. Saves floor space. Single or multi-stage to meet the particular job. Sump barrel length determined by NPSH requirement. For corrosive or non-corrosive service.

Temperatures	— 320°F to 550°F
Capacities	to 9000 gpm
Heads	to 2000 feet

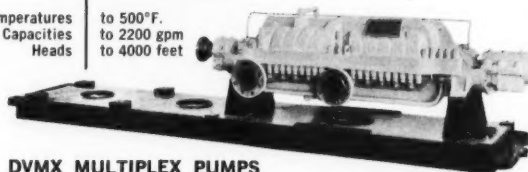


VERTICAL CIRCULATING PUMPS

High efficiency with medium-to-high capacities. Single or multi-stage, turbine type units have simplified piping and installation... use little floor space.

Pump sizes	16" to 57"
Capacities	to 45,000 gpm
Total head	500 feet

Temperatures	to 500°F.
Capacities	to 2200 gpm
Heads	to 4000 feet



DVMX MULTIPLEX PUMPS

Compact design with double row bolting prevents interstage leakage or bowing at parting flanges — even at 4000 psi hydraulic pressures! Symmetrical design allows safe operation to 500°F... metallurgy and construction permit speeds to 7000 rpm. Easily adaptable for interstage take off at intermediate pressures.

BJ OFFERS A COMPLETE LINE
of pumps to answer almost any need.
Send us your job description for a
specific recommendation.

BJ
SINCE 1872

Byron Jackson Pumps, Inc.

A Subsidiary of Borg-Warner Corporation

P.O. Box 2017, Terminal Annex • Los Angeles 54, California

Exporting Medicine

From page 28

pectancy of three-quarters of a century.

Longevity Not Just a Statistic

We can only increase longevity by saving the lives of many of the 112,000 infants who died last year before they had a chance, of the 75,000 men and women who were struck down by cancer in their thirties, forties and fifties, of the 158,000 whose heart or blood vessels failed them before they had even tasted the first year of retirement.

If we lengthen life for the average man, we will also enrich it, by improving the health and increasing the enjoyment of all mankind.

From here on in the longevity race is going to be rigorous, which is one of the reasons I am confident we can beat the Russians. Sanitation, the control of epidemics, the prevention and cure of contagious diseases — these are mostly behind us. Ahead lie cancer, cardiovascular diseases, the degenerative and crippling scourges of old age. Medical research, in which we are far stronger than the Soviets, is going to make the major breakthroughs.

But the attack will have to be on a broader front than that. It will also have to be carried out without either weakening the institutions of freedom or damaging the doctor-patient relationship, which is the keystone of American medicine.

A Global War Against Disease

Here are some of the things it seems to me we will have to do in order to win the race for a longer life:

1. Greatly expand our medical research effort.
2. Train more doctors.
3. Create a bold new foreign medical aid program.
4. Raise the standard of living.

For more information on product at left, specify 6582 . . . see information request blank opposite last page.



FANSTEEL SOLVES SPECIAL VENTILATING PROBLEM

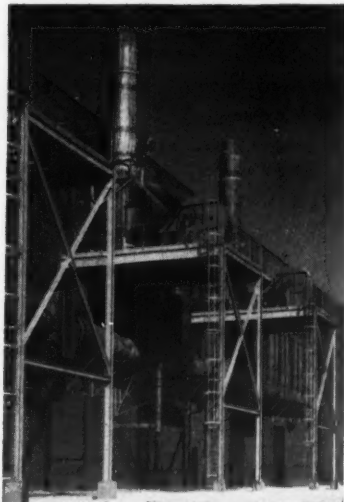
WITH "BUFFALO" RUBBER-LINED FANS

New Fansteel Metallurgical Corp. Tantalum Plant in Muskogee, Oklahoma



Tantalum Capacitors like this are made from Fansteel Tantalum. They are important components of electronic, aircraft and missile systems.

"Buffalo" Rubber-Lined Fans provide efficient ventilation for the critical control necessary in the Chemical Operations Building of Fansteel's new, ultra-modern tantalum plant.



Key point in Fansteel's new facilities is the Chemical Operations Building, where the valuable metals tantalum and columbium are produced. Removing impurities and extracting the metals from the ores requires a series of precisely-controlled chemical and electrochemical operations.

Where air handling is so important, it is understandable that Fansteel should turn to "Buffalo", whose 81 years of engineering experience assures satisfactory ventilation under critical conditions.

"Buffalo" Rubber-Lined Fans are noted for their ability to withstand many years of punishing service. Rubber is vulcanized to all parts of the fan exposed to the air stream. There is no possibility of separation, hardening or cracking. Savings in down-time and fan parts more than pays for the slight extra cost of the rubber.

Whatever the type of severe service your fans may encounter, there is probably a "Buffalo" Fan to handle the job. Contact your nearby "Buffalo" engineering representative, or write direct for Bulletin 2424-F today.

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK



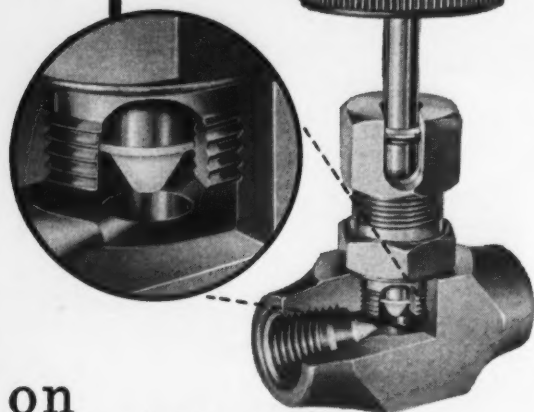
Buffalo Pumps Division, Buffalo, N. Y.
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT
EXHAUSTING • FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING

Check 6583 opposite last page

INSTRUMENT ENGINEERS ...

here's a
money-saving
tip



on
small valves

You can stop worrying about heavy-handed operators ruining the stem points and seats on your small valves when you install Hoke's new 270 Series bar stock valves with plastic pointed stems. Let them "tighten down" all they want, because these long-wearing nylon or corrosion-resistant Kel-F tips have taken 700 cycles of operation at 3500 psi using twice the normal closing force—and the valve did not leak across the seat. They'll save you money three ways—cutting valve replacement, down-time and maintenance.

Use this new Hoke valve for vapor or vacuum leak-tight closure, in service up to 5000 psi. It also minimizes opening pressure surges, and meets applicable MIL specs for use on high pressure compressors. Available in $\frac{1}{8}$ " or $\frac{1}{4}$ " sizes, globe or angle pattern, with O-ring or Teflon packing. All valves can be panel-mounted.

Complete information
is yours on request.
Write us today.



HOKE INCORPORATED
FLUID CONTROL SPECIALISTS
145 South Dean Street
Englewood, New Jersey

*Why buy big
when you can buy small*

Check 6584 opposite last page

Exporting Medicine

From preceding page

ing and health of the less privileged groups in our society.

5. Start a concerted drive to unlock some of the mysteries of the process of aging, of heart disease and cancer.
6. Lift preventive medicine to the status of equal partnership with the curing of disease.

(Copies of the complete speech, "A Global War Against Disease," are available on request to Public Relations Dept., Merck & Co., Inc., Rahway, New Jersey.)

Check 6585 opposite last page.

Air Pollution

From page 33

Bureau, Bureau of Mines, Bureau of Standards, Department of Agriculture, Library of Congress, and the Tennessee Valley Authority.

In addition, all but the last two of these agencies, on request of the Community Air Pollution Program of the Public Health Service, provide specialized technical services to states, communities, and industrial groups. This arrangement makes it possible for the Public Health Service to avoid duplicating on its staff and in its laboratories the skills and facilities well developed in the cooperating agencies.

Direct air pollution activities of the Public Health Service are quite extensive. Mode of action of the principal gaseous and carcinogenic pollutants are being studied in experimental animals; local mortality and morbidity statistics are being analyzed on a nation-wide basis for a clue to pollutant action; epidemiological studies of the effect of air pollution on human health are being made in several communities.

Basic data on air quality are being routinely measured in all major U.S. cities. At least one urban and one non-urban station is operating in each state.

The Problem of Oil Vapor

... and how
to solve it!



Vape-Sorber is a registered trade name of Selas Corporation of America.

Chemical and pharmaceutical manufacturers, petroleum refiners, food processors and users of pneumatic instrumentation ... all encounter critical procedures wherein hydrocarbon vapor in compressed air and process gas streams produces adverse results.

Typical Vape-Sorber uses include:

- Aeration and agitation of liquids
- Air-cleaning of containers
- Protection of desiccants for dehydration

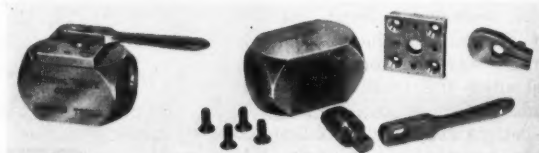
The Selas Vape-Sorber, effectively combining principles of liquid-gas separation and high capacity oil adsorption, completely removes hydrocarbon vapors, dirt and liquid-phase entrainment of every kind. Its compact, welded steel construction contains no moving parts, requires minimum maintenance.

Send for your free copy of this new Vape-Sorber booklet No. 15. It describes, by chart and table, the exact size and model for your requirements.

SELAS CORPORATION OF AMERICA | DRESHER, PENNSYLVANIA

Check 6586 opposite last page

**FLASH! ...DO NOT
OVERLOOK THIS NEW VALVE**



LET US BEGIN BY INTRODUCING TO YOU possibly the only butterfly valve with a positive seal at 150 p.s.i. in sizes $\frac{1}{4}$ ", $\frac{3}{8}$ ", $\frac{1}{2}$ ", $\frac{3}{4}$ " and 1". Made female screw end only. Weight 12 ounces.

The body is made of aluminum bar stock; the synthetic rubber seat is permanently molded to the body; the one-piece disc and stem is stainless steel. In addition to the aluminum body, which is standard, any other type of available metals can be used. It is light in weight, economical in price, and should last indefinitely in most applications. It can be operated by a positive positioning handle or by mechanical operator and can be furnished with a separate locking mechanism to hold the disc in any position. Raise handle to operate.

Possibility for the use of this valve for water, air, food and chemicals is tremendous, particularly for panel boards where remote control is necessary. Prices upon request.



KEYSTONE VALVE CORP.

P. O. BOX 6716
5325 KIRBY DRIVE HOUSTON 5, TEXAS

REPRESENTATIVES IN VARIOUS CITIES THROUGHOUT THE WORLD

Check 6587 opposite last page

CHEMICAL PROCESSING



Send for
the most
widely used

Hi-eF SEPARATION SELECTION GUIDES

Here's how to simplify and speed your specification and selection of scrubbers, separators, purifiers and mist extractors. Send for a complimentary copy of these easy-to-use selection tables. With these handy charts, in a matter of seconds you choose units for even the most difficult applications. Our engineering department will be glad to send you these tables to save you time, effort and money. Circle the reader service card now.



THE V. D. ANDERSON CO.

division of International Basic Economy Corporation
1948 West 96th Street • Cleveland 2, Ohio

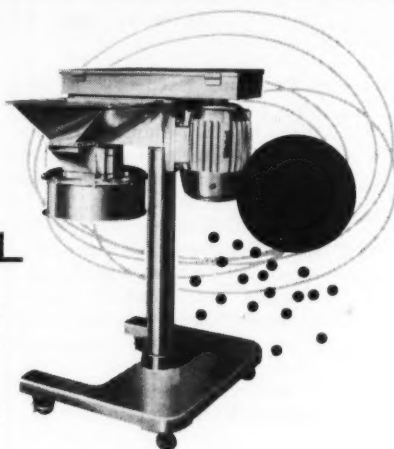
See the
Chemical
Engineering
Catalog

One Complete Dependable Source for Purifiers • Scrubbers • Separators • Mist Extractors

Check 6588 opposite last page

A POWER PACKED PUNCH
WITH PRECISION
REDUCTION

THE NEW TORNADO HAMMER MILL



Now you can pulverize and granulate virtually tons of chemicals (wet, dry or sticky) with uniformity previously impossible at high speeds.

The simplified TORNADO Hammer Mill is easy to clean . . . easy to operate and reduces down time to minutes.

SPECIAL FEATURES

- Uniform granulation.
- Stainless materials used in product contact areas.
- Low temperature rise — processes many heat sensitive products.
- 4 sizes — up to 75 H.P.
- VERSATILE . . . granulates, pulverizes, mixes and disperses.
- For dissolving and pulping too.
- Compact . . . Portable . . . requires small floor space.

OPERATING INSTALLATIONS — Ciba, American Cyanamid, Warner Chilcott, Merck, Congoleum Nairn, General Mills, and many more.

Send for descriptive literature.

REDUCTION MACHINERY CO.

435 Park Avenue • Plainfield, N. J.

Check 6589 opposite last page

AUGUST 1958

The Instrumentation Section of the Community Air Pollution Program is currently testing improved methods for field measurement of smoke density, odor intensity, sulfur dioxide, and fluorides. Space does not permit description of other activities along these lines.

Technical Services

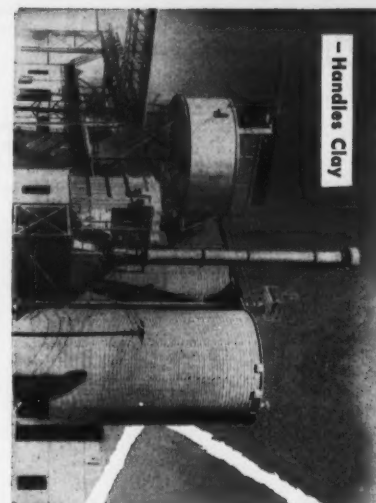
Technical service to, and cooperative field studies with, states and communities is the responsibility of the State and Community Services Section of the Community Air Pollution Program. This section makes available the consultative services of its own staff of air pollution generalists, the legislative and legal talents available from our Washington headquarters staff, and the specialist talents of the air pollution research staff at the Robert A. Taft Sanitary Engineering Center in Cincinnati, Ohio, and of the other participating Federal agencies.

Because both governmental agencies and industry have increased the pace of their air pollution activities, the demand for trained persons has far exceeded the supply. To help rectify this situation, Federal funds have been granted to 12 universities to support both graduate, undergraduate, and extension courses, and students in air pollution.

Highly specialized short courses are being conducted at the Sanitary Engineering Center. This past year an Air Pollution Technical Orientation Field Course was introduced at Tacoma (Wash.), Denver (Colo.), Austin (Texas), and Nashville (Tenn.).

These are just some of the many programs that are being carried out by Federal agencies in air pollution. It is obvious that much more research and study of air pollution will be needed.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



Handles Clay

Before we
built this
bin we had
to know...

1. The characteristics of the material.
2. The method of loading.
3. The method of discharge.

Over a long period of years, we here at Neff and Fry have learned that a strong bin is only part of the storage problem.

While we do not sell machinery, nor are we affiliated with any machinery manufacturers, we can be of great help to you in suggesting loading and unloading systems.

On your next storage bin, call us in on the early stages of planning. You will have a better bin.

NEFF & FRY • 166 Elm Street, Camden, Ohio

The difference
is in the shape
of the
STAVE!



Check 6590 opposite last page

High-vacuum distillation process at Trans Penn. Stills are in foreground, degassing chambers in background, vacuum pumps and gear pumps on floor under other equipment



Low-micron vacuum distillation IS practical in producing certain low-cost products for highly competitive markets. Here's a case in point: From a mixture of Mid-Continent raw wax distillate and dewaxing aid . . .

HIGH-VACUUM DISTILLATION recovers 2500 lb/hr of paraffin wax

DANA B. BERG, Managing Editor
with W. W. TARR, President, Trans Penn Wax Corp.

Problem: Recovery of salable paraffin wax from mixture of Mid-Continent raw wax distillate and a dewaxing aid was slow and costly for Trans Penn Wax Corp., Titusville, Pa. Besides, process did not lend itself to strict quality-control standards demanded by company management; there was too much room for human-judgement error.

Method in use consisted of adding Micro-Cel to mixture,

settling, and filtering, followed by percolation of paraffin wax, the filtrate, through bauxite. At least half the paraffin wax in initial mixture was discarded with cake from first filtration (75% of cake was wax). It was not economical to process this cake further for the bound-up paraffin wax.

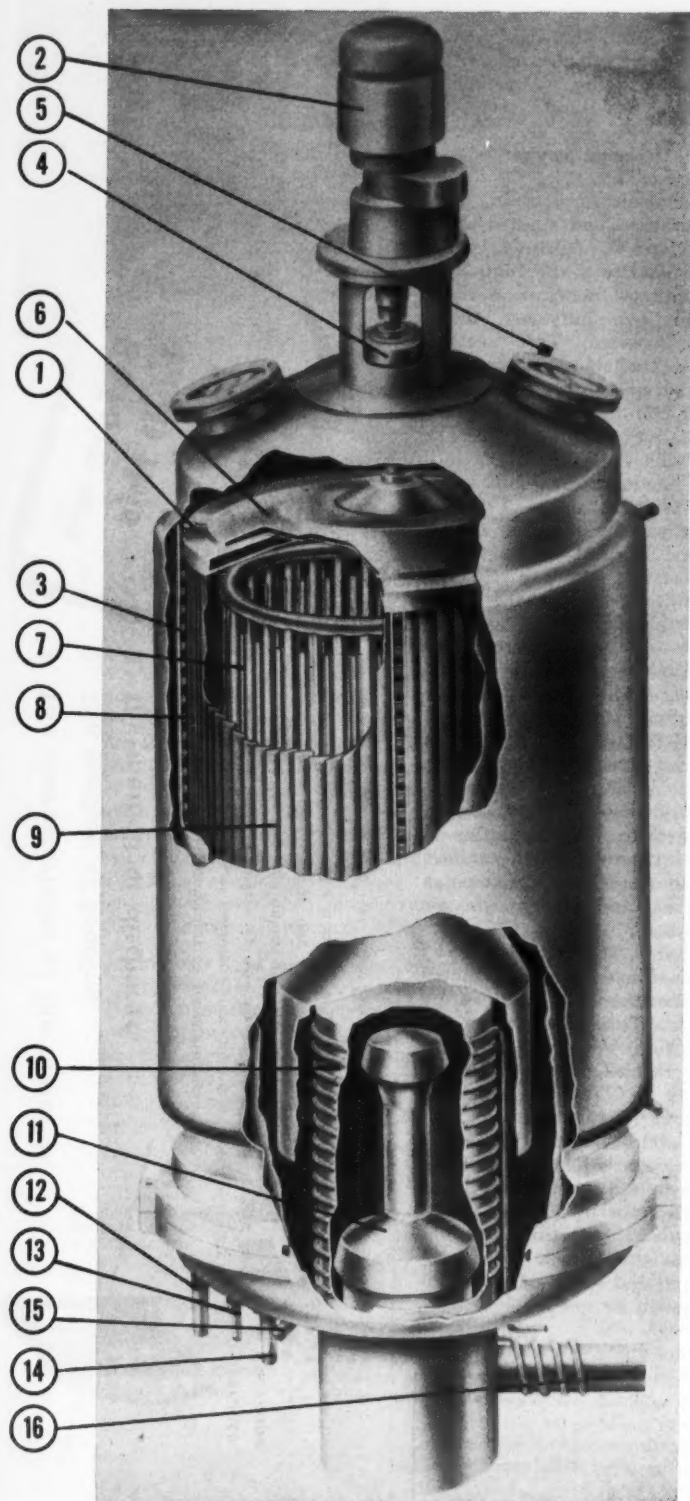
Solution: Obviously an atmospheric or near-atmospheric distillation was out of the question, since cracking would take place at the temperatures involved. However, high-vacuum distillation was investigated on a laboratory scale at the University of Rochester. Results justified application of this method for commercial operation. The Titusville plant started producing in August 1957.

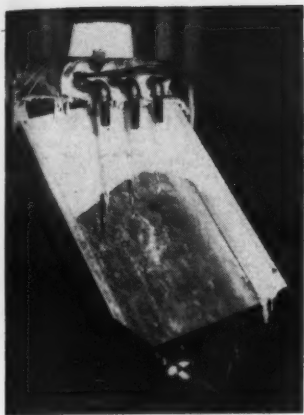
Simple Flow Sheet

Flow pattern through the process is not complex. Feed from storage tanks is pumped

"Vacu-Film Processor". Rapid distillation is assured by rotating wiper; low pressure drop through unit permits reduced processing temperatures

- | | |
|--|-------------------------------------|
| 1) Feed nozzle to evaporator | 9) Entrainment separator |
| 2) Gearhead motor | 10) Diffusion-pump condensing coils |
| 3) Evaporator wall | 11) Built-in diffusion pump |
| 4) Oil- and vacuum-sealed stuffing box | 12) Residue outlet |
| 5) Distilland feed | 13) Condenser inlet |
| 6) Rotor | 14) Distillate drain |
| 7) Vertical-tube condenser | 15) Condensate drain |
| 8) Carbon wipers | 16) To forepump |





CP Staff Photo

▲ Paraffin product has 30 Saybolt color, no taste or odor

by oil-sealed gear pumps through four degassing chambers in series. It then goes to three high-vacuum stills ("Vacu-Film Processors") connected in parallel in relation to feed stream. Residue (bottoms) from two of the stills is pumped through the third still along with its share of the fresh feed.

Paraffin wax (distillate) from all three stills is combined and given a final clean-up with percolating filter before going to slabbing operations. Residue is stored and later marketed as a heavy microcrystalline wax (this contains the dewaxing aid present in original feed).

At present, Trans Penn is producing 2500 lb/hr of paraffin but they see the possibility of jumping this at least 50% without any difficulties. (Original feed contains about 94% paraffin and essentially all of it is recovered.)

Feed enters stills at 185°F; paraffin and residue leave at around 220°F. Still heating surface is held at 500°F by circulating Dowtherm. Condensing surface is cooled by 52°F water. Pressure in still is approximately 50 microns Hg absolute.

Interior design of still is illustrated in accompanying drawing. Unit is accelerated-film type. Rotating wiper assembly, equipped with verti-

Fast Delivery of Sola-Flex® Expansion Joints...cuts costly down time!

*Proven, dependable Sola-Flex Joints
can be "in service" one to
four weeks after receipt of order!*

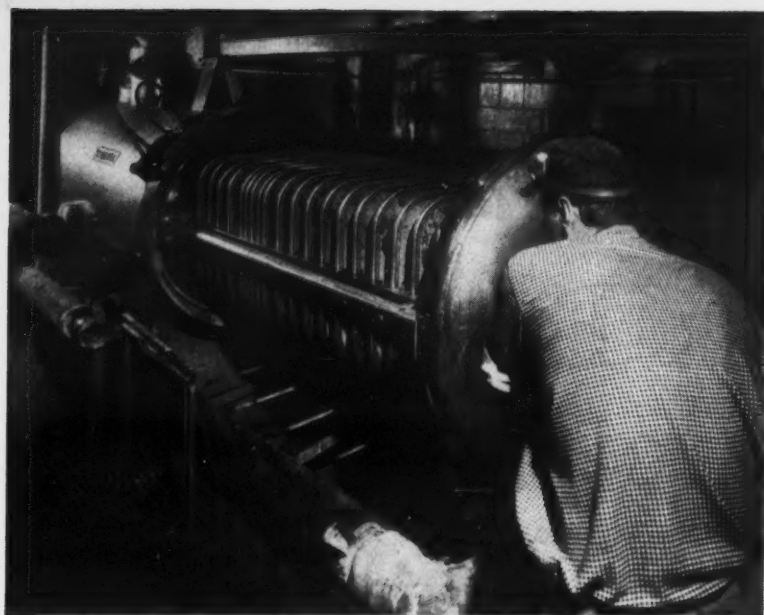
In power or processing plants, failure of a single expansion joint can mean slower production, expensive repairs, even complete shutdown. That's why, when faced with possible trouble, you want replacement joints *fast!* And you want joints that will protect against future unscheduled down time. Solar makes the world's most complete line of expansion joints. They are made in a wide variety of stainless and high alloys, are available in a complete range of sizes and styles, withstand difficult extremes of temperature and pressure. Best of all, rugged Sola-Flex joints can be "in service" in one to four weeks . . . *or less!* For a new Sola-Flex catalog, write to Dept. F-46, Solar Aircraft Company, San Diego 12, Calif.

SOLAR
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SAN DIEGO
DES MOINES

Check 6591 opposite last page



More time on stream!

FASTER CLEANING . . . Some users report as much as 50% reduction in downtime with Niagara Filters. This unit, in sizes up to 2000 sq. ft. of filter area and 250 cu. ft. of cake capacity, can be cleaned by ONE MAN in a matter of MINUTES.

LESS MAINTENANCE . . . Niagara Filter users gain here, too, because of this filter's simple, efficient design. All Niagara Filters are designed and built in strict accordance with the A.S.M.E. Code. For details as they apply to your processing problem, see the Chemical Engineering Catalog or write today describing your requirements.

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Dept. CPN-858, EAST MOLINE, ILLINOIS
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Specialists in Liquid-Solids Separation

Check 6592 opposite last page

NEW SOLUTIONS

cal retainers carrying replaceable Teflon-and-carbon wipers, maintains uniform liquid-film thickness on stainless evaporator wall. This provides short contact time, fast distillation rates, and low power consumption. Average time in still proper is not any more than one second.

Pressure drop is held to minimum by locating condenser as close as practical to evaporative surface and taking advantage of largest possible open path to condenser. Thus, processing temperature is lowered considerably. Condenser is stainless fin-tube design for rapid, efficient heat transfer.

Vacuum for each still is produced by conventional series coupling of NRC high-speed gas-ballast mechanical pumps and Edwards oil-diffusion pumps.

Each 36"-diam still contains 48.5 sq ft of effective evaporation surface.

Results: Trans Penn estimates that they can process 40% more feed than before, at one-fifth the cost. They now recover practically all the paraffin in the feed, where before they lost much of it in the filter cake.

Better Quality

Product quality is markedly improved: no taste or odor, Saybolt 30 color after percolating. This means there is no cracking or degradation in distillation.

Distillation setup offers a high degree of flexibility if different cuts are desired. In fact, Trans Penn Wax Corporation has a subsidiary company which solicits custom distillation of materials from outside concerns on a contract basis.

The still is a "natural" for such work since all parts are readily accessible for cleaning when changing from one product to another.

(The "Vacu-Film Processor"—formerly Arthur F. Smith's Rota Film still—is now manufactured and marketed by Rodney Hunt Machine Co., Orange, Mass.)

Check 6593 opposite last page.

the *Beach-Russ* *Combination* **"TWO-STAGE" VACUUM PUMP**



No. 100
Combination
"Two-Stage"
Vacuum
Pump

The Beach-Russ Combination "Two-Stage" Vacuum Pump gives tops in service at the low micron range.

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Check 6594 opposite last page
CHEMICAL PROCESSING

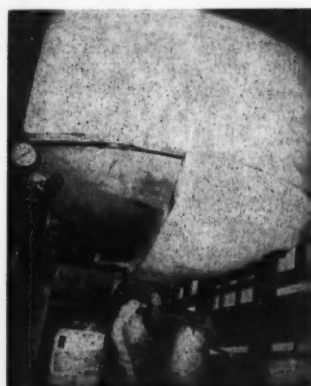
NEW SOLUTIONS

Foam insulation method cuts installation time by two thirds

Reduces number of operations; offers ease of handling

An insulating job which normally would have taken 64 hours with any other material was completed in only 23 hours with urethane foam at the Chambers Works plant of E. I. du Pont de Nemours & Co. The urethane foam application was of the blanket type and was used on a sweat pan.

The insulation was applied by first using 4"-wide strips of adhesive on the metal, as well as on the backside of the urethane foam blanket. After waiting five minutes for the



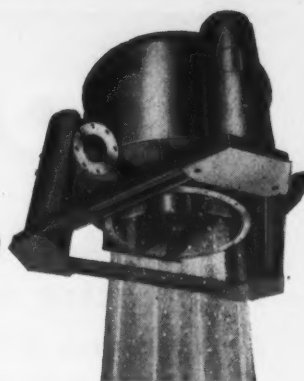
Urethane foam insulation reduces installation time and offers improved ease of handling

solvents to evaporate off the adhesive, the blanket was pressed firmly against the adhesive. It was then covered with a sheet metal jacket; the same type used over the former insulation.

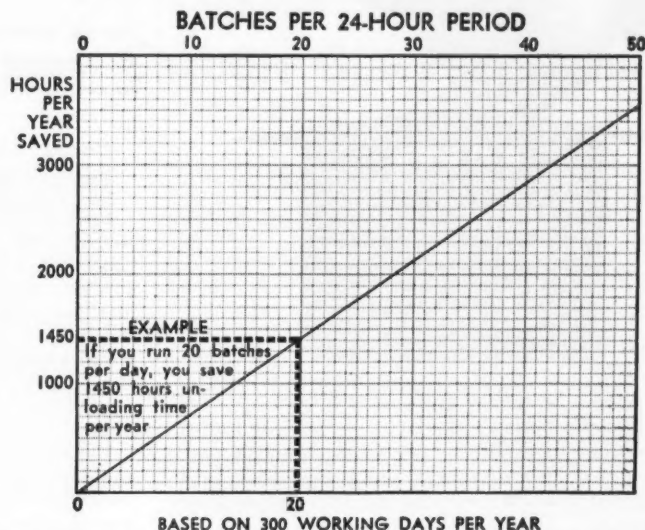
The new method of insulation reduces the number of operations required and offers improved ease of handling. In the old method, clips or spindle anchors had to be welded to the material. Then, 3 x 36" lags of insulation were impaled over the clips or spindle anchors.

Urethane foams are soft to the touch and easy to handle, and have tensile strengths of 25 psi. The blanket-type insulation can be installed on hot or cold work and glued with contact cement. The ma-

PREDICT the centrifuging hours you save in a year



This most revealing chart quickly shows how much unloading time you can actually save, with Batch-Master's® rapid bottom discharge and hydraulic unloader. The chart is based on Batch-Master's unloading time (30 seconds average) . . . as compared with that of a manually unloaded batch centrifugal (15 minutes or more). If the chart gives you a jolt, investigate Batch-Master.



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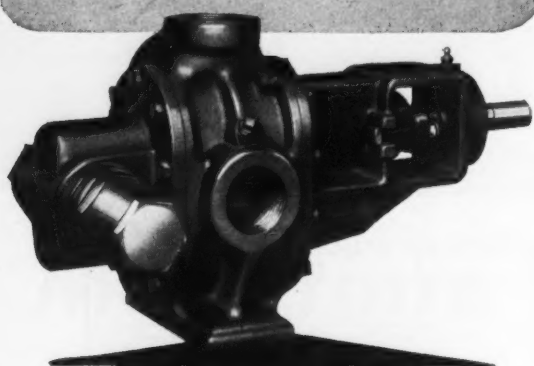
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AUGUST 1958

Check 6596 opposite last page

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Designed for a broad range of clean liquid applications, the Roper Series 3600 General Purpose Pump is widely recognized for its highly dependable performance, low maintenance characteristics, and ease of installation • Roper standard fitted models have cast iron housings, hardened iron gears, 4 high-lead bronze bearings and precision-ground steel shaft. All-iron models, with hardened iron bearings, are also available for specific needs. All models are available with or without adjustable relief valve in mechanical seal or packed box construction • The Roper representative in your vicinity will be glad to go over your requirements with you, whether you are interested in pumps for replacement or for original equipment in new processing operations. Call him today!

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Check 6597 opposite last page

NEW SOLUTIONS

terial can be formed to a snug fit on pipe, odd size nozzles, etc. It is easily cut with a pair of shears or sharp knife. It will not break in shipment.

Urethane foam provides effective insulation for temperature range of -300 to 250°F. At 75°F, low density foams have K factors in the range of 0.22 to 0.28. Lower thermal conductivity means that insulating material with less thickness can be used.

("Hylene" organic isocyanates, one of chief raw materials used in urethane foams, is manufactured by E. I. du Pont de Nemours & Co., Wilmington 98, Del.)

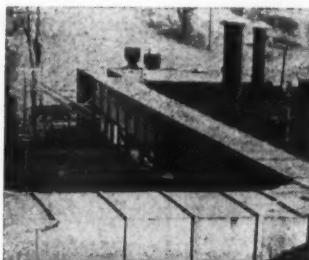
Check 6598 opposite last page.

Tough service performed by plywood manifolds in cellophane plant

Handle sulfuric acid mist,
other chemical wastes

Problem: Exhaust manifolds that would stand up under continued exposure to low concentrations of sulfuric acid mist, hydrogen sulfide, carbon disulfide, sulfate salts, and water vapor were sought by a large chemical company for installation in their cellophane plant.

Used to remove warm ventilating air containing these waste products from processing equipment, temperatures

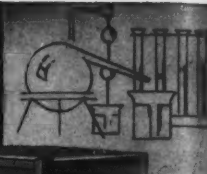


Exhaust manifold has been in service four years, has needed no maintenance

inside ducts would vary from 86 to 140°F. Outer surfaces would be exposed to atmosphere.

Solution: After thoroughly
To page 121

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Check 6599 opposite last page

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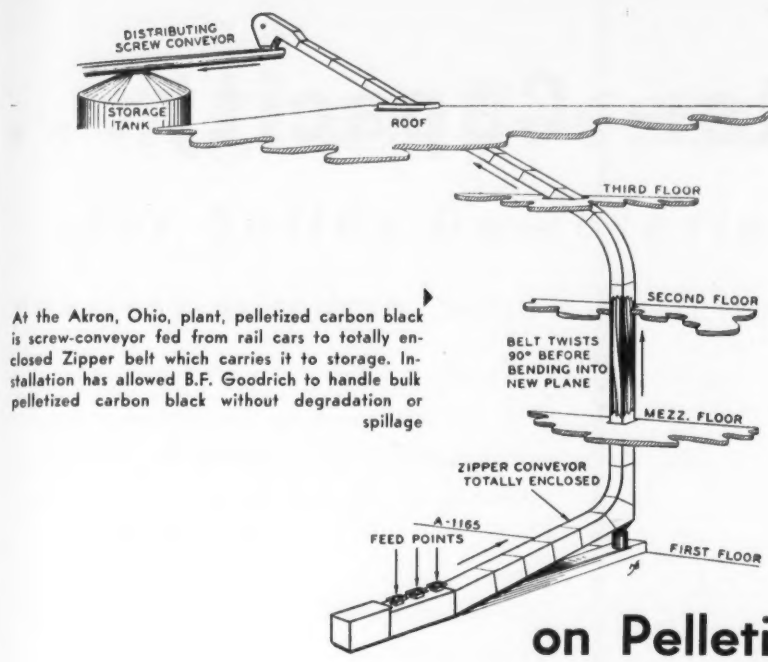
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Rockwell ER Meter with large reset register

Check 6600 opposite last page

CHEMICAL PROCESSING



At the Akron, Ohio, plant, pelletized carbon black is screw-conveyor fed from rail cars to totally enclosed Zipper belt which carries it to storage. Installation has allowed B.F. Goodrich to handle bulk pelletized carbon black without degradation or spillage

Existing vertical screw-conveyor system broke down carbon black pellets. B. F. Goodrich replaced nine vertical screws with a Zipper conveyor-elevator, eliminated degradation, and . . .

SAVED \$36,000 IN FIRST YEAR on Pelletized Carbon Black Handling

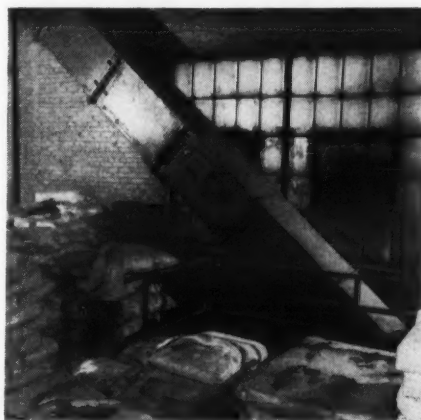
Problem: When pelletized carbon black came on the market, B.F. Goodrich Company engineers found that they could not satisfactorily handle pellets in existing conveyor system. Vertical screw section of system which was designed to unload and convey soft furnace blacks broke down pellets.

This resulted in a lot of fines which overloaded conveyor and created problems in dispersion of black in rubber compounding.

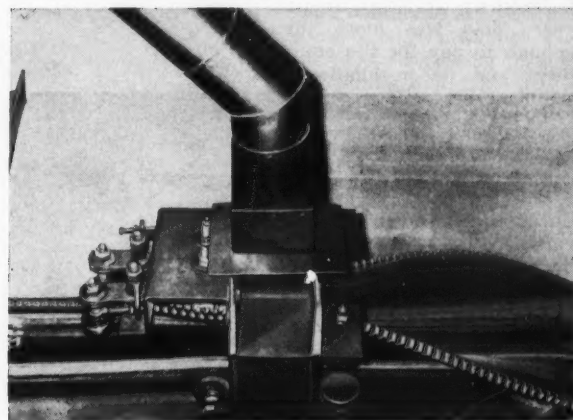
Figures had shown that the conveyor unloading and bulk handling methods had resulted in savings in labor and time of more than \$100 per car. Before installation of system, blacks were bought in bags which were delivered to platform, unloaded, hauled by tractor to an elevator, delivered to warehouse level, transferred to another tractor and stored until needed.

Company did not want to go back to bag handling in order to take advantage of pelletized carbon black.

Solution: At the Akron, Ohio, plant, a Zipper conveyor was purchased to replace nine screw conveyors in the system. Two horizontal sections of screw system were retained



Out of the way, against a wall, compact installation is shown here as belt passes through third floor area used to store bagged carbon black for special requirements. Belt is enclosed in metal guard for safety



Filling and closing Zipper conveyor belt. Pelletized carbon black drops onto Zipper belt through spout. Rollers located left of loading point mesh teeth and "zip" belt closed, forming a tube in which load is carried

— one to carry material from car to Zipper belt and other to convey from Zipper belt to storage tanks. Research proved that by feeding small amount of pelletized black in a large horizontal screw conveyor, minimum pellet breakdown occurred.

The Zipper conveyor-elevator consists of an endless, flat rubber base belt, side walls hinged to base belt and interlocking teeth molded on out-

er edges of side walls. Side walls are opened for empty runs, for passing around pulleys, and for cleaning. As material is fed onto belt at a uniform depth for maximum load, side walls are automatically closed around load and teeth meshed as in ordinary zipper fashion. Since load is entirely closed within belt, it must travel with the belt — there is no agitation of material.

Carbon black falls by gravity from railroad cars into three 12-in screws below ground level, which carry material a short distance into building to three unloading points. Zipper belt passes beneath these three outlets. Screw discharge rate is adjusted so that each outlet adds a little material to the belt. At the last point, Zipper is filled and closed.

Belt climbs vertically

NEW SOLUTIONS

through three floors, hugging the building all the way, and receives a 90° twist as it climbs. Twist is required since belt is loaded at the top and discharges from the bottom. Belt cuts through roof and automatically unzips to unload onto a horizontal screw conveyor (187 ft long, 18 in diameter) that fills four storage tanks.

Tonnage of material fed to belt is determined by the horizontal screws which receive flow from cars. This has amounted to as much as 30 tons in three hours and 50 minutes. Although the present belt speed is 192 ft per min, it would operate equally well over a wide range of speeds with maximum tonnage varying in proportion to speed. Total length of belt is 330 ft. Supervision of entire operation is handled by one man at a control board.

Results: Cost records show that the Zipper belt saved B. F. Goodrich \$36,000 in the first year. This was more than enough to pay for the equipment and its installation at the plant.

Saves Time, Space

Belt has also greatly reduced time needed to unload carbon black from railroad cars. Its compact installation saved space. Belt's design provides a cleaner method for moving carbon black to storage.

As the Zipper has permitted purchase of pelletized blacks in bulk shipments rather than in bags, company continues to realize savings from the bulk-bag price differential which is even greater today than when system was installed.

(Zipper conveyor-elevators are manufactured by Stephens-Adamson Manufacturing Co., Aurora, Ill.)

Check 6601 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

Greater Capacity . . .



... Higher Pressures for Solids Dewatering

SHARPLES ADVANCED DESIGN CENTRIFUGES

P-7000 SUPER-D-CANTER—The largest of six sizes of continuous scroll type solids discharge centrifuges for the clarification of crystalline or amorphous solids . . . The P-7000 will handle solids at rates in excess of 12-15 tons/hr. *For operation at pressures to 150 psi.*

SUPER-D-HYDRATORS—These high efficiency crystal drying centrifuges are available in 3 sizes, the largest of which has a capacity on ammonium sulphate in excess of 20 tons/hr. *For operation at pressures to 150 psi.*

DH-6 NOZJECTOR—Designed to handle feeds in excess of 500 gallons per minute. This is the largest of 3 sizes of continuous solids discharge nozzle type centrifuges for the clarification and concentration of solids in slurries and sludges. *For operation at pressures to 150 psi.*

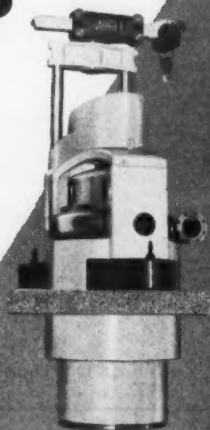
Sharples is setting new standards of capacity and all-round performance with the only really new centrifuges being offered today. If a solids dewatering step is necessary in your processing, it will pay you to get the facts from Sharples.

Your inquiry will be given our prompt attention.

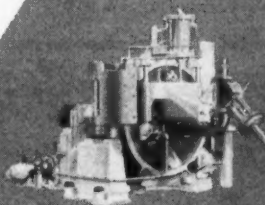


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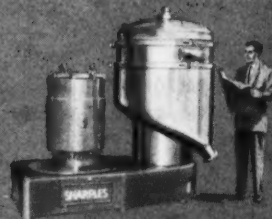
Check 6602 opposite last page



P-7000 VERTICAL SUPER-D-CANTER



SUPER-D-HYDRATOR for dewatering crystals



*

The bowl (rotor) of a pressurized D-HO NOZJECTOR—the largest and highest capacity nozzle type centrifuge available to industry.

From page 118

investigating the pros and cons of numerous materials, a high-density overlaid fir plywood was selected.

The product has a resin-impregnated fiber permanently bonded to the surface. This results in a hard, tough, wear-resistant surface, virtually impervious to moisture absorption.

The plywood used to construct the ducts was 1/2" thick, with overlay on both sides. Sections were fabricated with lap-joint reinforcing strips of the same material on the outside, and with split 3x3" cypress timbers forming fillets on the inside. Interior and exterior joints and all raw wood surfaces were coated with an epoxy glue.

When completed, each duct consisted of a manifold 150' long, tapering to a 4' square at each end from a 4x6' cross-section at the mid take-off point.

The manifolds are tied into several process machines with vertical ducts passing through the building roof.

Results: Installed over four years ago, the plywood exhaust manifolds have given excellent service. No maintenance has been required.

(Further information about fir plywood can be obtained from Douglas Fir Plywood Association, 1119 A Street, Tacoma 2, Washington.)

Check 6603 opposite last page.

Better spray drying through use of triplex pump

Problem: Difficulty was encountered keeping pumping pressure constant on feedstock entering 55-ft high spray dryer at a large New Jersey chemical plant. Fluctuations in pressure would change size of particles emerging from atomizer nozzle in dryer and affect density of dried product.

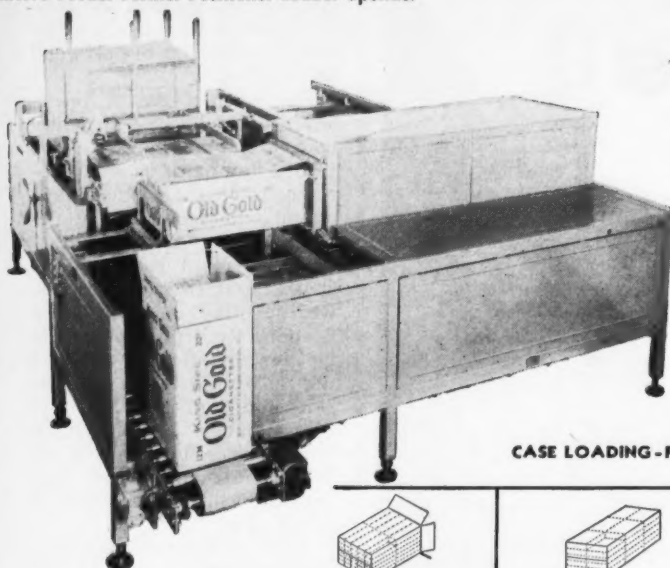
Even the smallest pressure change could upset the critical balance between the tem-

To page 124

Which Packomatic solves your production line problem?

T.M. Reg. U. S. Pat. Off.

Packomatic Feeder-Former-Positioner-Loader-Upender



Require a fully automatic case loader?

Here's a fully automatic case Feeder-Former-Positioner-Loader that is breaking records on actual production line conditions in a variety of industries. And by end-loading techniques, savings on paper board alone run as high as 28%. Production jumps dramatically with this high-speed, continuous-motion machine. Labor costs are lower, too, because except for hand-stacking corrugated shipping containers in flat form into the magazine, everything's automatic. Below are some of the end-loading patterns showing number and packing of cartons. Check with Packomatic engineers if your loading pattern does not appear here. Custom-engineering will produce a Packomatic for your product.

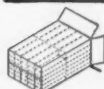
CASE LOADING-PATTERNS:



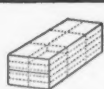
Twenty-four cartons
in 12 1/2" x 10 3/8" x 8 1/2" case



Eighteen 7 & 8 oz. cartons
in 20" x 14 1/8" x 8 3/8" case



Sixty cigarette cartons
Regular: 14-13/16" x 11 1/2" x 22" case
King Size: 17 7/8" x 11 1/2" x 22"



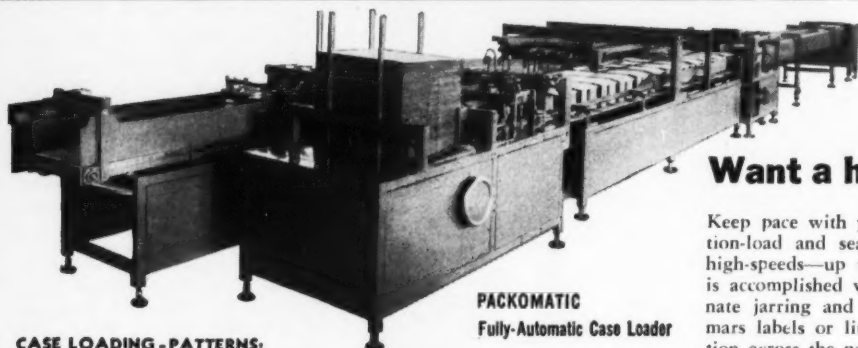
Thirty 1 lb. cartons
in 16 1/8" x 10 1/8" x 7 1/4" case



Twenty-four cartons
in 19 1/2" x 10 3/8" x 7" case



Forty-eight cartons
in 22 3/4" x 23 1/2" x 15 1/8" case



CASE LOADING-PATTERNS:

handles any can from the 12 oz. to the 5-qt. Imperial

Six 5-qt. cans or gallon cans in
20 1/4" x 13-5/8" x 9-13/16" case
and 20 1/4" x 13 3/4" x 9 1/4" case



Twelve 46 oz. cans
in 21" x 13" x 7 1/8" case



Twenty four 12 oz. cans
in 16 3/4" x 10 1/8" x 5 1/8" case



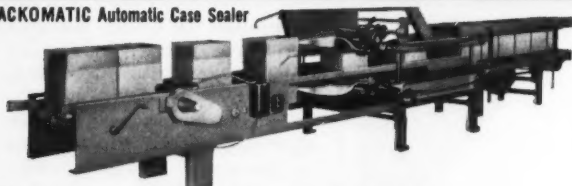
Six No. 10 cans
in 22 1/8" x 17 3/8" x 7 1/8" case



Want a high speed can line?

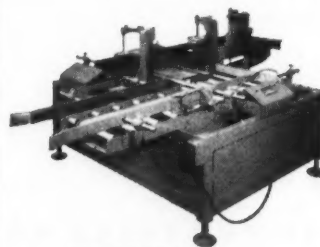
Keep pace with your production line. Now, feed-form-position-load and seal your corrugated shipping containers at high-speeds—up to 720 cans a minute—automatically. This is accomplished with a smooth continuous motion to eliminate jarring and bumping of cans that causes leakers and mars labels or lithographing. Machines in successful operation across the nation, (Packomatic was first with a successful production-line machine) end-load a variety of can sizes—from six 5-quart cans to twenty-four 12-oz. cans—in such patterns shown at left. End-loading reduces paper board costs. Automation saves labor costs. From corrugated flats to sealed containers, only one part-time attendant is required. Consider this time-money saver for your plant. We can custom-engineer a machine like this for you.

Packomatic Automatic Case Sealer



Like to seal automatically?

Here's the machine for you—the first fully automatic case sealer proven under actual production line conditions. No operator needed to align corrugated cases, open flaps, glue, seal and discharge ready for shipment. Adjustable to a wide range of case sizes. Similar models, available semi-automatic.



Packomatic 4-Side
Case Imprinter with
serial numbering device.

Need 4-Side Imprinting

Prints either or both sides and ends of corrugated shipping containers with name and contents—in addition to imprinting a serial number. Very essential if using modern palletizing methods. The only machine of its kind. Other regular models available for minimum case imprinting requirements. Write for specs and prices.

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for more information on any of the products or services mentioned in this issue of CHEMICAL PROCESSING?

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For more information on product at left, specify 6604 see information request blank opposite last page.

J. L. FERGUSON COMPANY

Joliet 6, Illinois

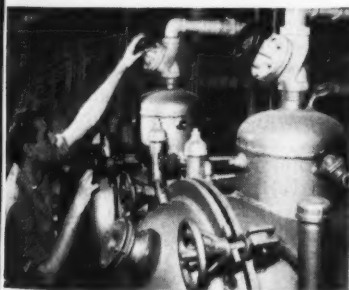
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**"Choosing the Right Valve"
—the basics to be observed**

This authoritative handbook gives you, in "boiled-down" form, basic data on valve design and the operating characteristics of each type. Includes notations on adaptability to specific service conditions. Twenty pages—completely illustrated. Useful to valve specifiers and buyers. Your copy sent free. (High-interest motion picture on same subject available for plant showings.) See below.

**Extended bonnet valves
for extremely low temperatures**

These special bronze body globe valves are successfully controlling liquid oxygen and liquid nitrogen down to minus 318 deg. F. Design features extended bonnet with insulation collar, replaceable seat and plug disc—all of stainless steel. Bonnet can be insulated up to collar. Stuffing box is above cold zone; assures easy, dependable operation. Made for 150- and 300-pound pressure ranges, with flanged, screwed or solder ends. See below for more information.

**Low-cost diaphragm valves
giving unusual performance
on critical vacuum service**

This California electronic parts plant, processing under constant high vacuum, finds one packless diaphragm valve design outperforms all others. After 18 months' service, these valves are still holding vacuum within 100-micron leak rate for 36-hour periods and longer. More details on next page.

**For literature or data on product listed above, please contact
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AUGUST 1958

**processing and engineering data**

232

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CARL HACK

Metallurgical Engineer, National Lead Company

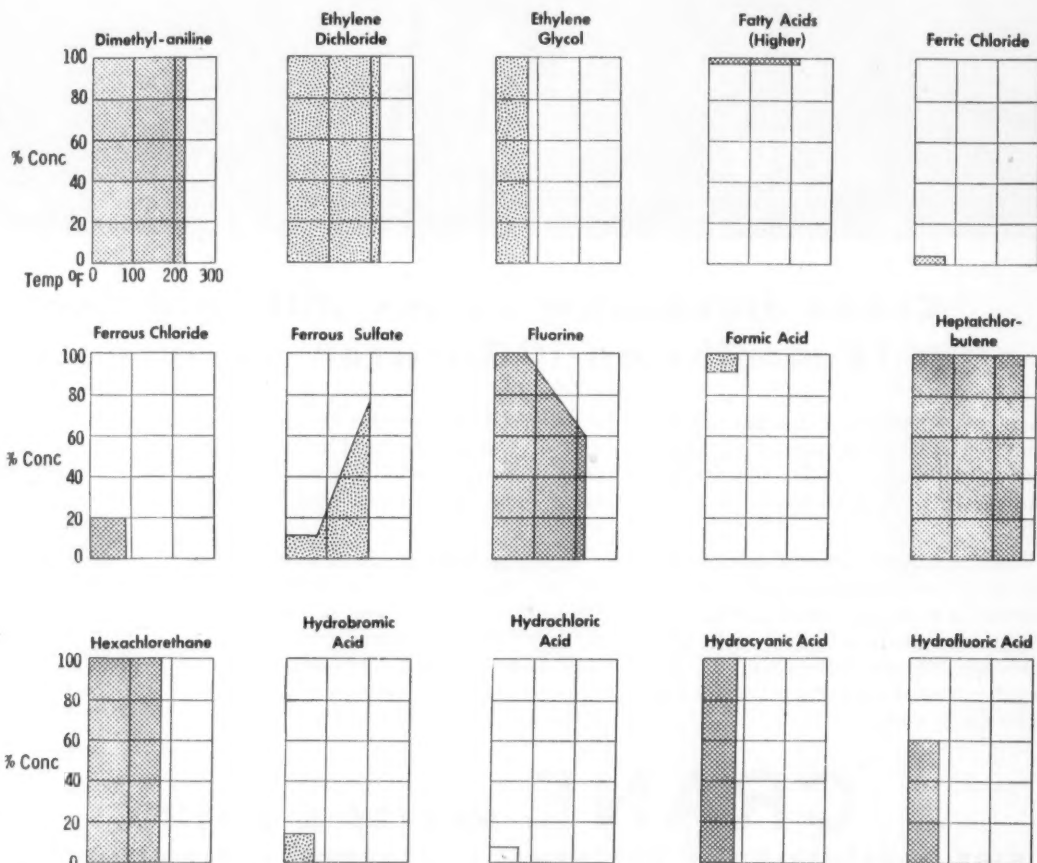
Less than
0.005 in /year

0.005 to
0.05 in /year

More than
0.05 in /year
Not recommended

These data for chemical lead are a continuation of Corrosion Keys from July **CHEMICAL PROCESSING** (Page 121). For a full description of composition and test methods please refer to this previous article.

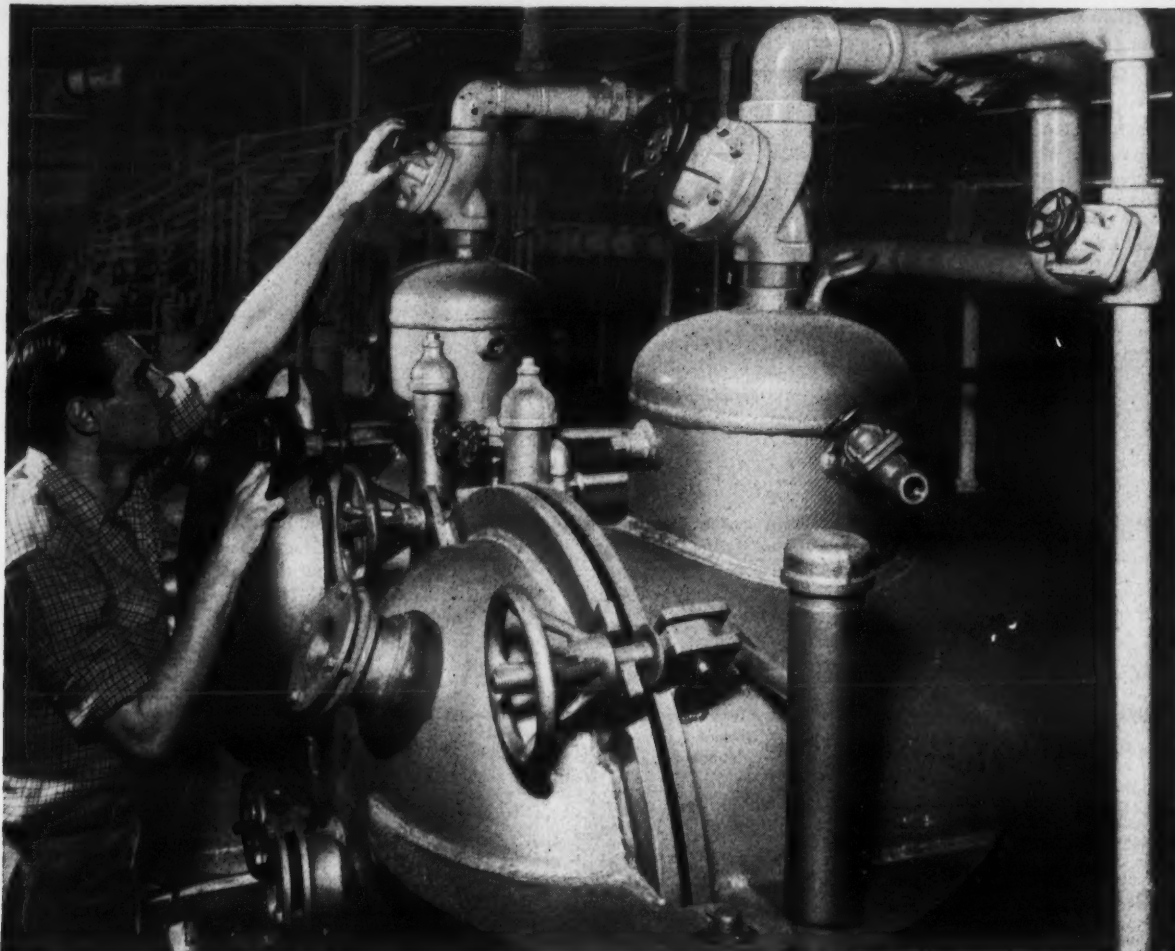
(For more information on use of lead in specific environments contact National Lead Company, Corrosion Engineering Section, 105 York St., Brooklyn 1, N.Y.)
Check 6606 opposite last page.



"Corrosion Keys" are copyrighted (1958) by Putman Publishing Company

To page 125

Packless valves assure Electron Products perfect processing



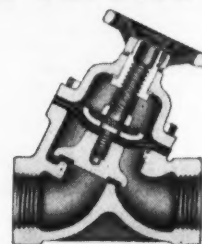
Crane diaphragm valves still hold tight after 18 months on 100-micron vacuum service

Electron Products Inc., Pasadena, Calif., forms special electronic parts of metalized paper. Processing—drying, deaerating, impregnating—is done under constant vacuum.

Valves, to hold the critical vacuum within a maximum leak rate of 100 microns for a 24-hour period during processing, had to be selected with care. Obviously not any valve would do. The choice—Crane diaphragm valves for high performance value.

After 18 months, these Crane packless valves continue to hold tight on this critical vacuum service for as long as 36 hours—and on occasion, over an entire weekend.

Crane packless diaphragm valves are widely used also in processing industries where absolute tightness is necessary to prevent leakage of volatile, corrosive and hard-to-hold fluids. Complete information available from your local Crane Representative, or write to address below.



Cross section, Crane diaphragm valve—note diaphragm seals the bonnet only, separate from disc function. It is not subject to severe flexing, crushing and abrasion as in valves where diaphragm does both jobs.

CRANE VALVES & FITTINGS

PIPE • PLUMBING • KITCHENS • HEATING • AIR CONDITIONING

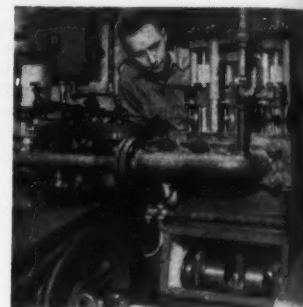
Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

Check 6607 opposite last page

NEW SOLUTIONS

From page 121

peratures of the feedstock and hot air stream. Result would be a boost in tower temperature that could char or carbonize heat sensitive products.



Working parts of pump can be inspected through transparent plastic window

Company dries variety of acid and alkaline products with pH from 1 to 10. Drying temperatures are between 140 and 164°F, depending upon material being processed. Uniform size and quality of final products require precise, undeviating atomization pressures in the 500 to 1000 psi range.

Solution: A 1¾-inch triple reciprocating pump was installed in place of the existing pump. Capable of handling 200 gph, unit is designed for continuous, precise-controlled operation. Motor is close to pump and there is no long drive belt. An easily maintained, short V-belt is used for this purpose.

Results: The new pump has been in use on this critical application for over a year. Operating 24 hr per day, 6 days per week, the unit has provided the exact necessary pressure without fluctuation, efficiently handling both acid and alkaline materials. Maintenance has also been simplified. Pump has only two gaskets to be serviced, instead of the 21 small gaskets on the old pump that had to be replaced every time the machine was taken down.

(Triplex reciprocating pump was manufactured by The Aldrich Pump Co., 1 Pine Street, Allentown, Pa.)

Check 6608 opposite last page.

THE
Chemical
Industry's
Choice



DARNELL
CASTERS
WITH
PHENOLIC
(DARNELLOPHEN)
WHEELS

Outstanding Features

- No rusting or corroding
- Non-marking
- Quieter rolling
- Will stand temperatures up to 200° F.
- High impact strength
- Resist oils, greases and most chemicals
- Wheels have beveled edges—protect floors better.

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10 WALKER STREET, NEW YORK 13, NEW YORK
31 NORTH CLINTON STREET, CHICAGO 5, ILLINOIS



processing and engineering data

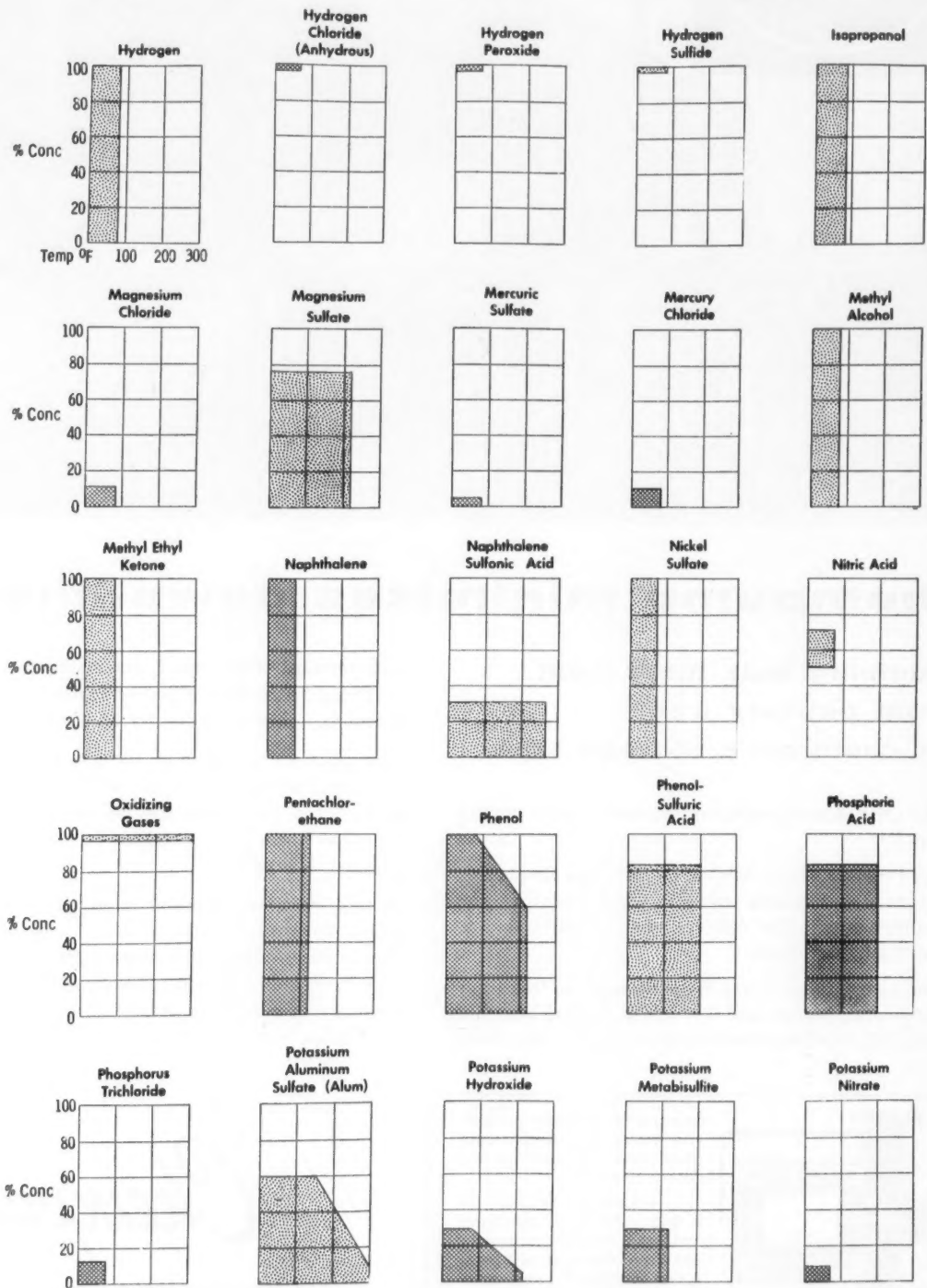
CORROSION KEYS: Lead

From page 123

Less than
0.005 in /year

0.005 to
0.05 in /year

More than
0.05 in /year
Not recommended



To page 127



Chempump minimizes downtime...

pumping bulk nitric acid from delivery truck to customer's storage tank

The *Chempump* mounted on this truck can't possibly leak.

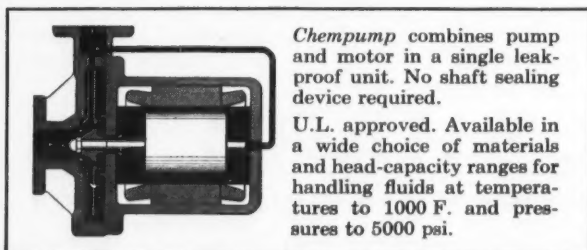
For Pressure Vessel Service, Detroit, this simple fact means a considerable saving in truck downtime and maintenance in the delivery of 63% nitric acid to electroplating plants.

The conventional pump formerly used on this truck persistently leaked acid through its stuffing box. The company faced expensive repair or replacement of the

acid-corroded truck bed. Pump maintenance was a continual, bothersome expense. Truck downtime was becoming a serious and costly problem.

Now, with a *Chempump* on the job, leakage is eliminated and maintenance is limited to a simple monthly inspection of pump bearings. No external lubrication is needed—bearings are constantly lubricated by the pumped fluid itself.

In any chemical handling application, *Chempump* offers many major advantages. You'll do well to check them. Write to Chempump Corporation, 1300 East Mermaid Lane, Philadelphia 18, Pa. Engineering representatives in over 30 principal cities in the United States and Canada.



Chempump combines pump and motor in a single leak-proof unit. No shaft sealing device required.

U.L. approved. Available in a wide choice of materials and head-capacity ranges for handling fluids at temperatures to 1000 F. and pressures to 5000 psi.

Chempump

First in the field...process proved

Check 6610 opposite last page

NEW SOLUTIONS

Salt water corrosion maintenance solved by resin compound

Setup time can be varied to fit particular job

Problem: The California Oil Company's Perth Amboy, New Jersey, refinery was faced with a serious salt water corrosion problem. Corrosion and pitting of equipment caused low operating efficiency.

In the past, usual maintenance remedy had been to remove the corroded area and replace it by welding in a new piece of metal or installing new section of pipe. In either case, extensive and costly shutdowns were required.

Solution: An epoxy resin and silica compound that adhered to metal surface was used to make patches and re-



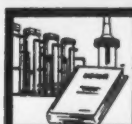
Use of epoxy-resin compound makes pipe repair job easy

pairs. Compound is simple to work with and can be used in shop or field. Handy tube dispensers permit user to mix proper amounts to obtain right composition and avoid waste. Pot life of mixture is about 30 minutes at 70°F.

Results: By using epoxy resin and silica compound, maintenance is simplified and costly shutdowns are eliminated. It is possible to vary setup time to fit particular job at hand because the compound is a two-component system

To page 128

from a small piece



processing and engineering data

Less than
0.005 in /year

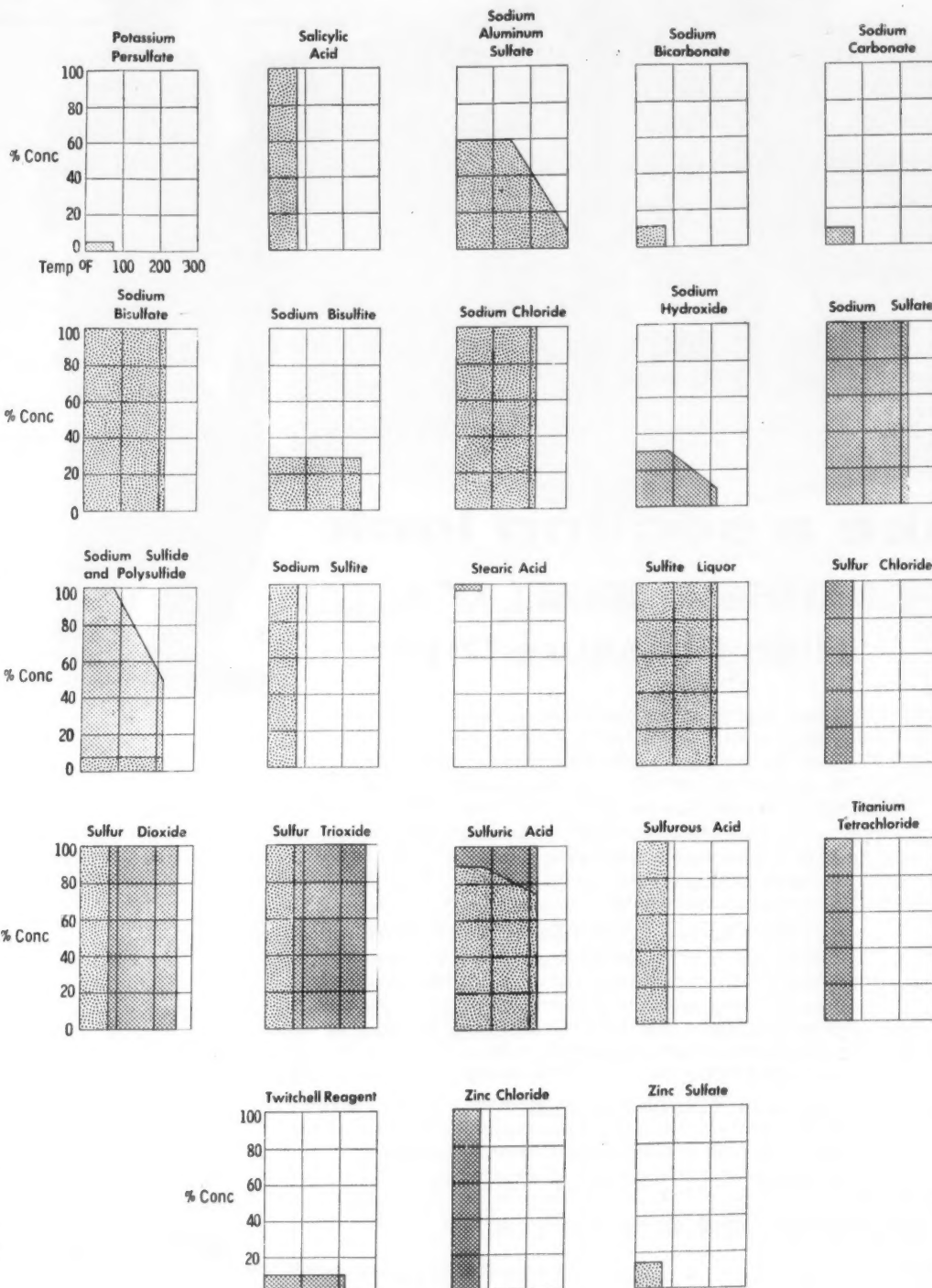
0.005 to
0.05 in /year

More than
0.05 in /year
Not recommended

232

CORROSION KEYS: Lead

From page 125



to a carload...

**Call Cambridge
for Industrial Wire Cloth**

Almost any standard mesh or weave, in any metal or alloy, that you might need is right here at Cambridge—waiting for your call. Partly, that's the secret behind the confidence purchasers have in ordering from Cambridge. They know their order will be filled promptly! Then too, they're sure of getting quality wire cloth. Every operation in the production of Cambridge wire cloth is rigidly controlled to assure accurate mesh count and uniform mesh size. Each loom is individually operated and the cloth is constantly inspected.

IF YOU NEED WIRE CLOTH FABRICATIONS—we can build them quickly and accurately from your prints. Or, our engineers will draw up prints for your O.K. Why not get in touch with your Cambridge Field Engineer soon, and find out all that Cambridge offers you in the way of wire cloth. He's listed in the phone book under "WIRE CLOTH". Or, write direct for **FREE 94-PAGE CATALOG** and stock list giving full range of wire cloth available. Describes fabrication facilities and gives useful metallurgical data.

**The Cambridge
Wire Cloth Co.**

Dept. F • Cambridge 8, Md.

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CONVEYOR
BELTS

WIRE
CLOTH
FABRICATION

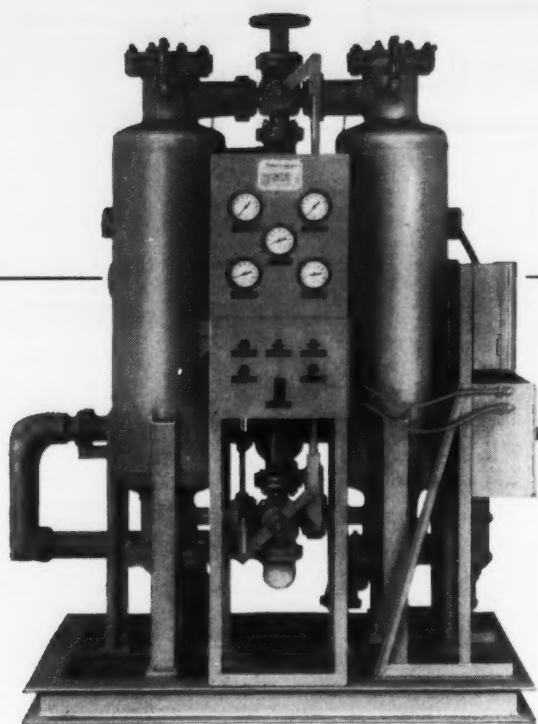
OFFICES IN PRINCIPAL INDUSTRIAL CITIES

Check 6611 opposite last page

AUGUST 1958

Chemical Processing — August 1958

127



Take a second look

At the Anders High Pressure Dryer

Anders High Pressure Dryers are continuous air drying units in which the adsorption, reactivation and cooling cycles are automatic, semi-automatic or manual. Capacities of standard Model IFH units range from 160 SCFM (standard cubic feet per minute) to 1,000 SCFM, at 90 F inlet air temperatures and 100 psi inlet air pressure. Other Anders models have capacities up to 11,500 SCFM and pressures up to 6,000 psi for use in missile work for helium and air drying.

Each dryer has two desiccant-filled towers equipped with internal electrical heaters for regeneration that can be replaced without disturbing the desiccant bed. One tower dries incoming air . . . while the second tower regenerates desiccant. Model IFH units, as illustrated, can be equipped with external coolers, so there is no bleed. All air or gas is retained within the unit for processing . . . none is wasted.

Look again . . . at the Anders approach to your air drying problems. Write for detailed information to Anders Lykens Corp., division of Milton Roy Company, 1300 East Mermaid Lane, Philadelphia 18, Pennsylvania.

Controlled Volume Pumps • Quantichem Analyzers
Chemical Feed Systems • Anders Air and Gas Dryers



Check 6612 opposite last page

NEW SOLUTIONS

From page 126

with a separate hardener, selected according to need.

Average patch sets up in about four hours at 70°F with only negligible shrinkage. Compound used by California Oil shows no change in weight after 11,000 hours of exposure to salt water.

(Epoxy resin and silica compound is product of Smooth-On Manufacturing Co., Jersey City, N.J.)

Check 6613 opposite last page.

Long plastic pipeline simply maintained, easily installed

Reported to be one of the longest plastic pipelines ever installed for the transfer of corrosive chemicals, 6200' of polyethylene pipe is used to transport saturated brine solution from zirconium and titanium sponge plant of Mallory-Sharon Metals Corporation to the sodium plant of U. S. Industrial Chemicals Co. Pipeline is in continuous, round-the-clock use between these two plants at Ashtabula, Ohio.



Easily installed, 30' sections of 6200'-long polyethylene pipeline are joined at installation site

The corrosive brine, a by-product in the manufacture of titanium and zirconium sponge, is sent to sodium chloride reservoirs where it is broken down by electrolysis into its sodium and chloride components and re-introduced into the system. The 6200'

Master PADLOCKS for chemical industries



Famous Master Laminated Padlocks

Multiple steel plates
... stronger than a
solid block! Genuine
brass cylinder, pin-
tumbler security. No
finer padlock protec-
tion.

Stainless Steel Combination Padlocks

Double-wall construc-
tion... 3 number
brass locking mecha-
nism. Available with
"Key-Control" — one
control key opens all
locks.



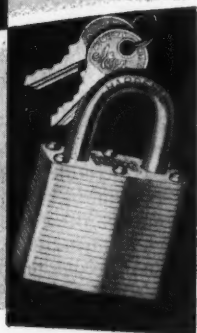
Special Long or Short Shackles

For switch boxes,
chains, truck or freight
car doors, and other
uses where special
shackle lengths are
more desirable.



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Master's Service De-
partment is geared for
fast delivery... in
emergencies, special
orders are on the way
within hours!



Corrosion resistant: cadmium rust-
proofed laminated steel; laminated brass
case, solid brass shackles; stainless steel
case on combination padlocks.

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Master Padlocks

EVERY ONE AN OUTSTANDING VALUE

Master Lock Company, Milwaukee 45, Wis.
World's Largest Padlock Manufacturers

NEW SOLUTIONS

pipeline was fabricated in 30' sections weighing 120 lb each.

The pipe is more than 1" thick with an inside diameter of 6.07". Coupled with welded and bolted flanges, the 30' sections were joined at the installation site.

Actual installation was simple. Assembled sections as long as 300' were rolled into place with a single push. Minimum of maintenance is required since polyethylene is resistant to corrosion from brine.

(Petrothene high-pressure polyethylene used for pipe is product of U. S. Industrial Chemicals Co., Div. of National Distillers and Chemical Corporation, 99 Park Ave., New York 16, N.Y.)

Check 6615 opposite last page.

Research case histories

Bulletin of 16 pages describes research facilities and services and features five case histories outlining client's problem, solution used, and results achieved. "Research in Chemical Processing" — Battelle Memorial Institute, 505 King Ave., Columbus 1, Ohio.

Check 6616 opposite last page.

Semichemical mill story

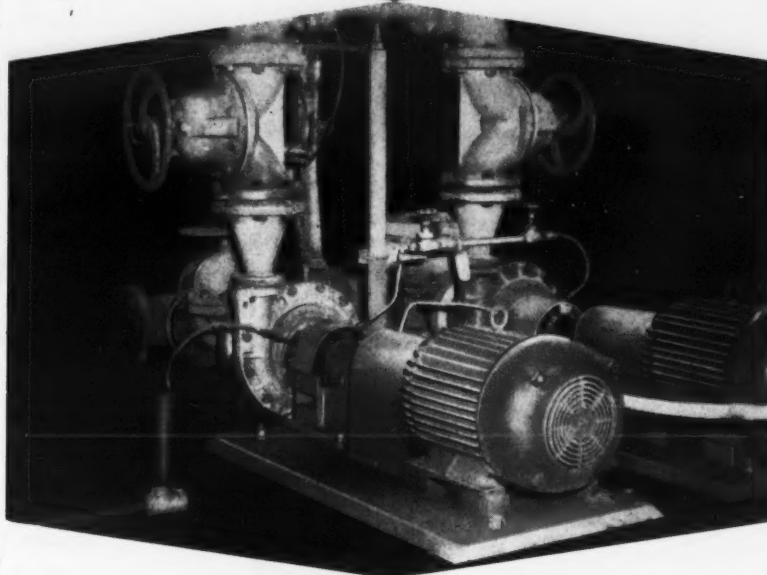
Italy's first semichemical mill is described in eight-page reprint which covers design and construction of mill, description of wood mill, pulp mill, bleach plant, and technical discussion of cooking data and — Sprout, Waldron & Co., Inc., 130 Logan St., Muncy, Pa.

Check 6617 opposite last page.

Correction Notice

In article starting on page 114 in June CP, statement was made that demineralizer described is rated at 14,600 gpm. This should have read 14,600 gallons per regeneration.

**ONLY DORR-OLIVER MAKES
3 DIFFERENT PUMP TYPES
for chemical processing**



Corrosion-resisting OLIVITE PUMPS

pay off at **gaf**

The 2" Olivite pumps shown above at General Aniline & Film Corporation's Linden, N. J., Dyestuff and Chemical Plant were installed after GAF had experienced considerable difficulty in the handling of concentrated muriatic acid and a caustic soda-sodium hypochlorite mixture at room temperature.

Lined with Dupont's Hypalon Elastomer for improved corrosion resistance, these Olivite pumps have given highly satisfactory and relatively maintenance-free service. Their performance is typical of Dorr-Oliver pumps — application engineered for chemical industry requirements.

Only Dorr-Oliver can offer three distinctly different pumps designed for complete coverage of chemical processing needs — the Olivite (lined), the O.D.S. (diaphragm) and the Type "L" (alloy centrifugal). For complete information write for catalog to Dorr-Oliver Inc., Stamford, Connecticut.

Hypalon—Reg. T. M. E. I. duPont de Nemours & Co.
Olivite—Reg. T. M. Dorr-Oliver Incorporated



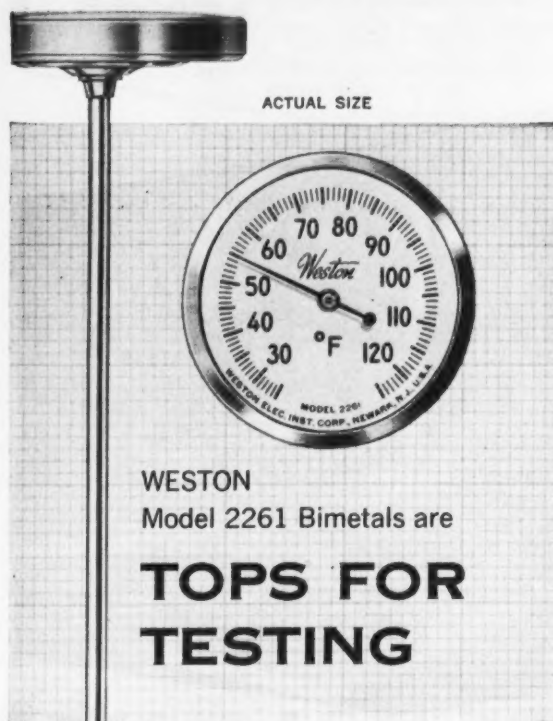
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INCORPORATED
WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT
STAMFORD • CONNECTICUT • U.S.A.

Check 6618 opposite last page

Check 6614 opposite last page

AUGUST 1958

WESTON THERMOMETERS: STANDARDS OF STABILITY IN SCIENCE AND INDUSTRY



WESTON Model 2261 Bimetals are **TOPS FOR TESTING**

Here's the ideal thermometer for lab or industrial testing. It offers consistent accuracy in the face of general abuse. Like all Weston bimetals, its sensitive helical element is characterized by exceptional structural stability and fast, dependable thermal response. This results in excellent readability and assured accuracy within $\frac{1}{2}$ of 1% of the full thermometer range. Except for the scale glass, Model 2261 is completely encased in stainless steel. 16 standard ranges are available covering the temperature spectrum from -100° to 500°F or -100° to 250°C . Weston also offers spike stem versions for food testing or internal oven use. Abnormal temperatures up to 50% over or under scale range will not impair the accuracy of Model 2261.

For further information, consult your local Weston representative, or write to Weston Instruments, Division of Daystrom, Inc., Newark 12, N. J., In Canada: Daystrom Ltd., 840 Caledonia Rd., Toronto 10, Ont. Export: Daystrom Int'l., 100 Empire St., Newark 12, N. J.

WESTON



Instruments

Check 6619 opposite last page



PROCESS INSTRUMENTATION & LABORATORY APPARATUS

As a practical matter, many desirable — and frequently almost necessary — analyses were too time-consuming with equipment available at Merck's research laboratories. Now Merck finds many analyses of volatile compounds can be carried out in less than thirty minutes

Chromatographic analyzer is flexible and fast

WILLIAM C. CLARKE, Assistant Editor
with Dr. GEORGE V. DOWNING
Merck Sharp & Dohme Research Laboratories
Rahway, New Jersey

Problem: Difficulties of following the kinetics of a pilot-plant reaction at Merck & Co., Inc., chemical research laboratories frequently required that half a day be spent in analyzing one sample. The particular analysis was of acetic acid in a distillate also containing acetic anhydride and toluene.

Problem lay in ease of hydrolysis of acetic anhydride to acetic acid which would interfere with any titration of the acetic acid. However, no other method was immediately available.

Although most details of work performed at the Rahway, New Jersey, laboratories are confidential, it can be mentioned that a wide number of problems of this same difficult nature are encountered almost daily. The Research Laboratories are engaged in research and development of fine organic chemicals, including vitamins, steroids, and other drugs, which require extremely close control in manufacturing and exacting product analyses.

Solution: Approximately one year ago, the Laboratories purchased a chromatographic analyzer to use on difficult analyses of volatile compounds. Instrument chosen was one with a double column and which would handle materials with boiling points to 350°C .



Merck and Company researcher injects a sample for a fast chromatographic analysis. Determining acetic acid in presence of acetic anhydride, without any worry about hydrolysis, is a typical problem

How Does It Work?

Chromatographic fractionation of volatile compounds and gases involves passing a carrier gas, such as helium, over a column of adsorbent which is a finely divided porous solid impregnated with a liquid which is non-volatile at temperature of column.

A small aliquot—approximately 0.01 ml in the case of liquids—of the sample mixture is introduced into the top of a U-tube containing the solid adsorbent. Carrier gas is then passed through the column at a constant flow rate, and the emergence of components from column is detected by a thermal conductivity cell coupled to a recorder.

Time required for a component to pass through column at a given temperature and flow is called the retention time. It is characteristic of the component and serves to identify it. Area under recorded peak is proportional to concentration.

Temperature of column is set so components of interest come off in a reasonable length of time. Either partial or complete analysis of a mixture is possible, depending on problem and nature of sample. If the mixture has a narrow boiling point range, all components are usu-



MICRO SWITCH Precision Switches

Compact high capacity UL listed explosion-proof switches

ally separated easily at one setting of column temperature.

Mixtures containing materials boiling over a range of hundreds of degrees may be handled in two ways: if only a few components boiling in a narrow range are of interest, a temperature is selected to separate them, the lower boilers coming off very rapidly and the higher boilers being left on the column. If entire mixture is of interest, column temperature may be programmed up slowly so that all components are separated.

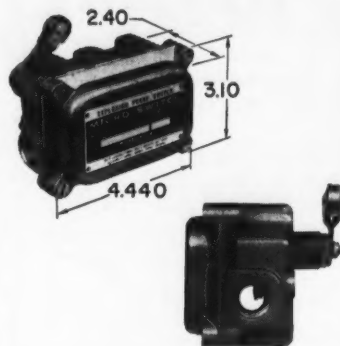
Choice of the non-volatile liquid absorbed on the solid depends on temperature of operation and nature of components being separated; different liquids have different separating powers for various classes of chemical compounds, but care must be taken that the temperature is not too high to evaporate the carrier liquid off the column.

Other Uses at Merck

Among other applications of the chromatographic analyzer at Merck and Company, besides following reaction kinetics of acetic anhydride, has been its use in checking purity of raw materials. Another has been analysis of some fatty acids. In addition to its use in research the instrument has become of increasing importance to work in the production division.

Results: As a practical matter, researchers at Merck and Company had not found time to do many desirable — and sometimes almost necessary — analyses before purchase of the chromatographic analyzer. Now researchers have found that use of the instrument has made possible many analyses previously considered difficult, and yet it is flexible and fast. The acetic anhydride-acid analysis now takes only about one-half hour instead of half a day.

The instrument has even permitted analyses of trace elements and other materials that had not even been previously attempted. Quantitative accuracies of approxi-



NEW

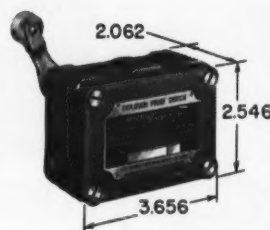
"EX1" SERIES

Series "EX1" switches have a conduit opening at both ends of the housing. This permits through wiring, which saves costs and space and improves appearance of the installation. Series "EX1" switches are available with four types of basic switches, with variations in electrical ratings, size of conduit openings and circuit arrangements. The switch illustrated has two 1/2-inch 14NPT conduit openings; capacity is 15 amps. 125, 250, 460 vac; 1/2 amp. 125 vdc; 1/4 amp. 250 vdc. Contact arrangement is SPDT. Request Data Sheet No. 129.

There is a wide variety of explosion-proof switches in the MICRO SWITCH precision switch line to help you boost productivity of equipment

Here are a few examples of the many variations in mechanical and electrical characteristics, housings and actuators which are available in MICRO SWITCH explosion-proof switches. All feature rugged construction in sturdy housings, with a choice of mounting positions. Information on these precision switches is available from the MICRO SWITCH branch office nearest you.

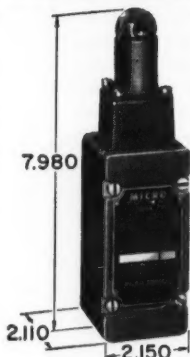
Listed by Underwriters' Laboratories for use in hazardous atmospheres Class 1, Group C and D; Class 2, Groups E, F and G.



"EX" SERIES, "AR" TYPE

Series "EX" switches have single conduit openings. They are available in a complete selection of actuators. There are 27 variations of the "AR" type alone, representing a wide choice of operating

characteristics, electrical capacities and contact arrangements. This "EX" series switch is designed for cam or slide operation. Actuator is operated by clock-wise rotation, and it is adjustable through 360°. The roller is of non-sparking silicon bronze. Send for Catalog 83.



"ML-E1" SERIES

The "ML-E1" series of explosion-proof limit switches meets a wide range of requirements. For example, there are two-circuit double-throw double-break switches with a rating of 10 amps. 120, 240, 480 or 600 vac; 0.8 amp. 115 vdc; 0.4 amp. 230 vdc. The roller plunger actuator is for cam or slide operation. Sealed head can be rotated 90°. Wide choice of other actuators. Send for Catalog 83.



"ML-E1" SERIES

This series "ML-E1" switch has a roller lever actuator which can be positively locked at intervals of approximately 0.4° (870 positions). The actuator can also be adjusted to actuate the switch in the clockwise direction only, the counter-clockwise direction only, or in both directions. The head assembly can be faced in any of four directions and the roller arm may be reversed on the head. Send for Catalog 83.

MICRO SWITCH . . . FREEPORT, ILL.

A division of Honeywell

In Canada: Honeywell Controls, Ltd.,
Toronto 17, Ontario

The two-word name MICRO SWITCH is not a generic term. It is the name of a division of Honeywell.

Look for the name of MICRO SWITCH
Authorized Distributors
in the Yellow Pages



Honeywell

MICRO SWITCH PRECISION SWITCHES

Check 6620 opposite last page

it takes only ONE

kates®

(SINGLE UNIT)

**CONSTANT FLOW
RATE REGULATOR**

to do the job of a system

Sounds incredible, doesn't it? No controller, no complex valve mechanism, no long approach piping, no electrical or pneumatic circuit—the functions of all these costly flow-system components are contained in this single compact unit, the Kates Flow Rate Regulator. This one unit *is* your system!

Kates saves you time and money...

1. Big reduction in first cost of equipment
2. Big reduction in installation costs
3. Virtually no maintenance — install your Kates Regulator and forget about it

If you need to control liquid rate of flow at any pressure, constant or varying, if you need to blend two or more fluids, a Kates Flow Rate Regulator can do the job for you more efficiently, and without the expense of a system.

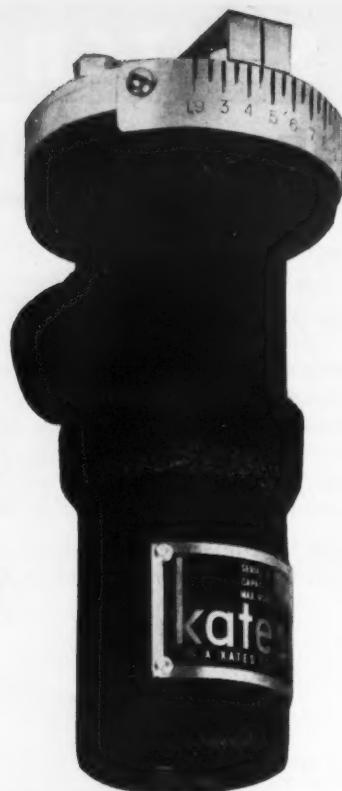
Write for technical bulletin No. 561 for complete information on operation and application.

kates®

W. A. KATES COMPANY

Department D.
430 Waukegan Rd.
Deerfield, Illinois

Check 6621 opposite last page



INSTRUMENTS & LAB

mately five percent have been attained, using calibrated standards.

The columns have been found to be readily changeable, and column temperatures are easily regulated without disturbing calibration of detector, which is in a separate constant-temperature bath. Maintenance of instrument has been found to be minor.

(Kromo-Tog Model K-2 is a product of Burrell Corporation, 2223 Fifth Ave., Pittsburgh 19, Pa.)

Check 6622 opposite last page.

Electronic recorder for fluid flows, levels, pressure

Will receive and record as many as four outputs

Uses: Recording any quantity measured by manufacturer's ring balance meters, including fluid density, liquid levels, temperature, pressure, electrical quantities.

Features: Electronic recorder will receive and record as many as four records simultaneously.

Description: Instrument can be specified either as an AC servo-operated bridge or DC potentiometer recorder. In combination with a ring balance-operated slidewire, instrument can be used for remote recording, indicating and integrating quantities measured.

Recorder is actuated from an input box containing appropriate components for measurement desired. From one to four input units can be used in a single instrument case. Various combinations of these units can be included as pneumatic transmission or controlling, alarm contacts, or mechanical computing devices.

Overall accuracy is 0.5% full scale. Pen travel time is 2 seconds full scale.

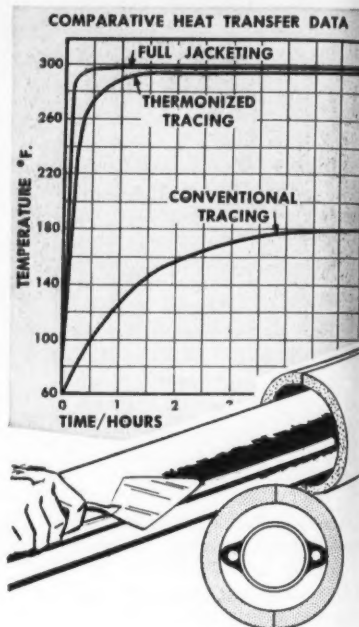
(Ring Balance Electronic recorder is product of Hagan Chemicals & Controls, Inc., 323 Fourth Ave., Pittsburgh, Pennsylvania.)

Check 6623 opposite last page.

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Thoroughly proved
HEAT TRANSFER MEDIUM
now effecting savings up to
90% for over 700 users!



Theron is a non-metallic plastic compound with highly efficient heat transfer properties, and is easily applied over either steam traced or electrical resistance systems... working equally well for either heating or cooling processes.

Theronizing has excellent heat transfer characteristics (see curves), exceeding steam traced equipment approximately 1100%, and closely approaching jacketing equipment. Theron can be used almost without exception in place of expensive jacketing (and in many applications where jacketing is impossible), with savings up to 90%.

Write for complete technical literature on revolutionary Theron!

See Theron Exhibit
at the
Second National Heat Transfer
Conference and Exhibit
August 18-20
Edgewater Beach Hotel
Chicago



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MANUFACTURING CO.**

1017 Rosine • P. O. Box 1961
Houston, Texas

Check 6624 opposite last page

CHEMICAL PROCESSING

Measures coatings and platings

- Detects cracks in smooth and rough coatings

Uses: Crack detection in metal, determining uniform thickness of paints and enamel coatings, thickness of tin plate.

Features: Thickness tester is designed for precise and non-destructive measurements. Instrument has accuracy of ten percent over range 0.00005 to 0.007".



Thickness tester measures non-destructively

Description: Operating on swept frequency eddy-current principle, instrument has high resolution and stability. As conductivity and permeability differ, each application requires its own frequency, bandwidth, calibration, and probe. Oscillator units, probes, and calibration charts supplied with instrument are interchangeable.

Instrument is also designed to be used in automated, process control applications.

(Model FLW-1 tester is product of Gulton Industries, 212 Durham Ave., Metuchen, New Jersey.)

Check 6625 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.

How to simplify control problems

Keep systems flexible, carry small inventory, cut maintenance cost with the **Bailey Building Block Method** of instrumentation and control.

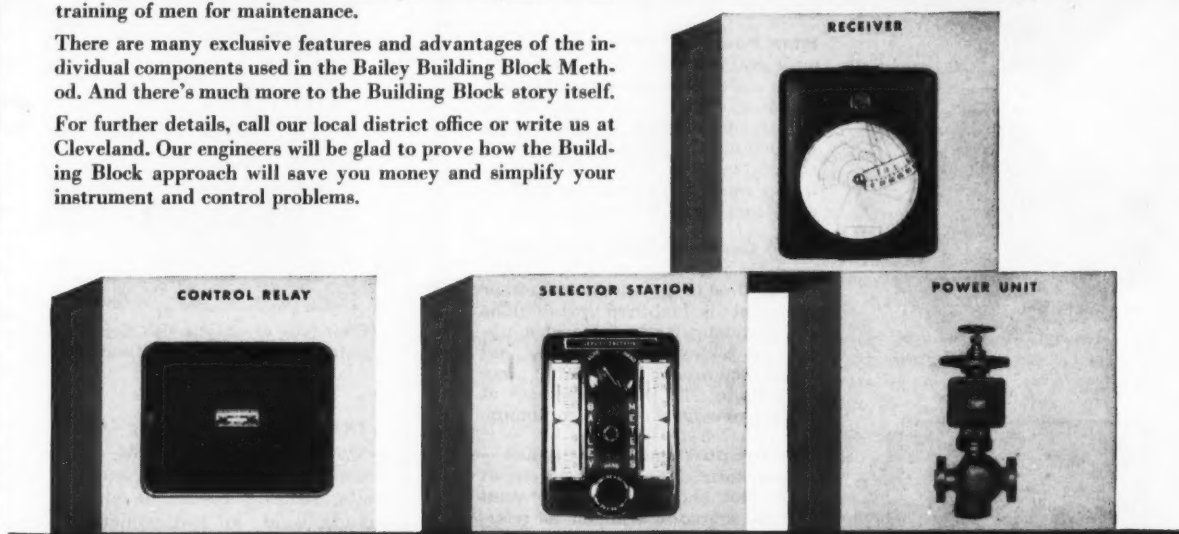
What is the Bailey Building Block Method? It's using standardized Bailey measuring, transmitting, and controlling components and combining them into any system you need. Components can be added as needed . . . removed and reused elsewhere . . . recombined into another system when the need changes. It's flexibility plus!

It's all based on the simple fact that a Bailey instrument or control component doesn't care if the measured variable is steam flow, tank level, or tower temperature, to pick just three examples. System components—transmitters, receivers, relays, selector stations, power units—are standardized for multi-purpose use.

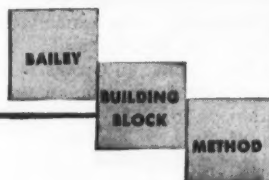
A spare component can be used in any one of many systems. Gone are delays waiting for shipments of special parts. Gone are large inventories of spares and parts. Simplified is the training of men for maintenance.

There are many exclusive features and advantages of the individual components used in the Bailey Building Block Method. And there's much more to the Building Block story itself.

For further details, call our local district office or write us at Cleveland. Our engineers will be glad to prove how the Building Block approach will save you money and simplify your instrument and control problems.



G36-1



BAILEY METER COMPANY
1074 IVANHOE ROAD, CLEVELAND 10, OHIO
In Canada — Bailey Meter Company Limited, Montreal

RESULTS IN: FLEXIBILITY, SIMPLICITY, ECONOMY



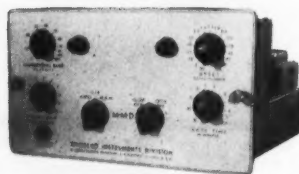
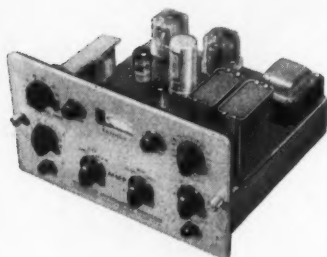
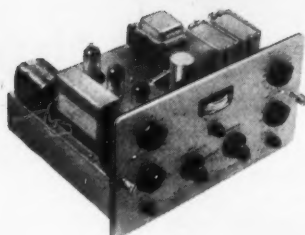
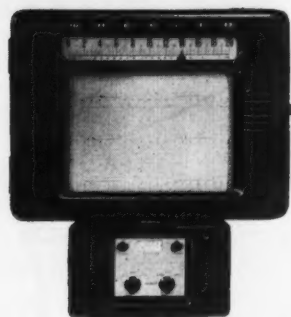
Check 6626 opposite last page

THE MARK OF QUALITY



Wheelco
Instruments

**Need proportional
reset and rate action?
Choose from four
controller types — that
include magnetic
modulation —
by Wheelco**



Start with this production-proved Wheelco Series 8000 recorder-controller* and add the MM Series controller* from four types (three magnetic modulated) available to insure getting the best installation for your needs. This customizing of systems at standard cost is another example of Wheelco's constant effort to improve performance while holding down costs. Advance design features include plug-in components and tamperproof covers to protect critical adjustments.

MMC-Current Output Type—Flexible in adaptation to final control elements including saturable reactors, electropneumatic transducers, electro-hydraulic transducers, etc. . . . proportional band adjustable from 2 to 200% of controller range . . . reset action from 0 to 63 repeats per minute . . . rate action adjustable from 0 to 5.5 minutes.

MMF Position Type—Together with potentiometer can position a valve, valve positioner, or other positioning device . . . reset action adjustable from 0.6 to 100 repeats per minute . . . proportional band adjustable from 2 to 200% of controller range . . . rate action adjustable from 0 to 5.5 minutes.

MMD Duration Type—With potentiometer regulates input by adjusting on-time of a contactor on either electrical or fuel-fired installations . . . particularly adaptable when upsets are fast and recovery slow and when they are frequent and of large magnitude . . . keeps overshoot at startup or control point to minimum.

MP Proportional Positioner—Transistorized and printed circuit unit (not shown) where constant voltage source is available as reference voltage . . . mounts inside instrument . . . adjustable from 2 to 40% of recorder range.

*Also usable with Wheelco 2000 and 9000 Series.

BARBER-COLMAN COMPANY

Dept. H, 1520 Rock Street, Rockford, Illinois, U.S.A.
BARBER-COLMAN of CANADA, Ltd., Dept. H, Toronto

Check 6627 opposite last page

INSTRUMENTS & LAB

Control systems

Bulletin of four pages describes purpose, design, and operation of manufacturer's metering and control systems. Discussion of pneumatic and electric telemetering, and pneumatic control is included. Bul 500 — Bailey Meter Company, 1050 Ivanhoe Rd., Cleveland 10, Ohio.

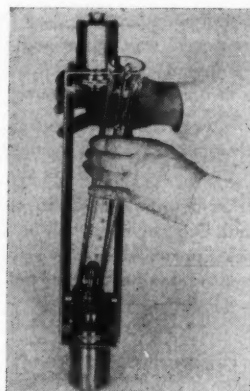
Check 6628 opposite last page.

**Snap 'in-or-out' meter
eases glass cleaning**

Reduces number of sizes
covering flow range

Uses: As variable-area flow meter for liquids over flow range of a fraction of a cc/min to 40 gpm.

Features: Flow meters have packing-less, snap-in and out metering tubes. Not only is glass cleaning eased but range changing is a simple, quick routine.



Glass tube of variable-area flow meter snaps in place without tools

Description: By using O-rings to seal tube ends to metal fittings, use of nuts, bolts, stuffing boxes, packing glands, and all adjustments has been eliminated. Piping strains cannot be transmitted to glass metering tube since tube "floats" in the O-rings. Side frames, front and rear covers are also of snap-in construction.

Design of flow meter permits coverage of flow ranges with only three meter sizes instead of the eight sizes for-

ILLCO-WAY

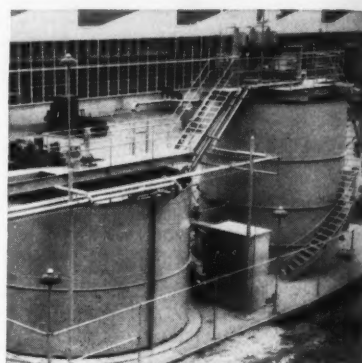
ionXchange

soften
de-alkalize
clarify

REMOVE

organic matter
turbidity
color
iron

WATER



U.S. AIR FORCE PHOTO

**HIGH-FLOW, UP-FLOW
CLARIFIER**

The Clarifier shown above is part of an ILLCO-WAY ionXchange installation, at a metal-finishing plant, which is used for waste disposal and water recovery. Similar Clarifiers are widely employed to clear up surface waters used by various industries — removing organic matter, hardness, alkalinity, turbidity, color, and iron, as required by specific conditions.

USED AS PRE-TREATMENT

In many instances it is more economical to use a Clarifier in the initial part of a system. Certain water supplies contain organic matter or turbidity which can be removed most efficiently by flocculation, or contain carbonate hardness or alkalinity which can be largely reduced by precipitation — in which situations, a Clarifier is indicated as best. Let us analyze the water you propose to use, and advise you.



**ILLINOIS WATER
TREATMENT CO.
840 Cedar St.
Rockford, Ill.**

NEW YORK OFFICE: 141 E. 44th St., New York 17, N.Y.
CANADIAN DIST.: Pumps & Softeners, Ltd., London, Can.

Check 6629 opposite last page

CHEMICAL PROCESSING

merly required. Inventory costs can therefore be reduced appreciably.

(Series 2700 flow meter is product of Fischer & Porter Co., 577 Jacksonville Road, Hatboro, Pa.)

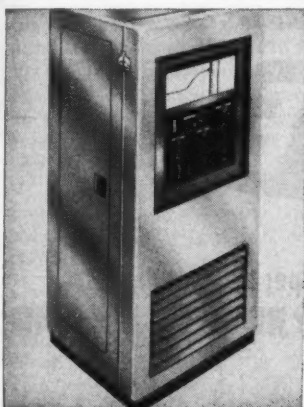
Check 6630 opposite last page.

Records sample weight as function of time or temperature

Vacuum thermo balance is self-contained

Uses: As applied and basic research analytical balance for studying metals corrosion, thermal decompositions, moisture determinations.

Features: Thermo balance records thermogravimetric curves of sample in vacuum or controlled atmosphere at temperatures to 1000°C.



Vacuum thermo-balance operates at temperatures to 1000°C

Description: Instrument is precise spring balance enclosed in glass chamber, two furnaces, and a linear transducer and recording system with temperature programming.

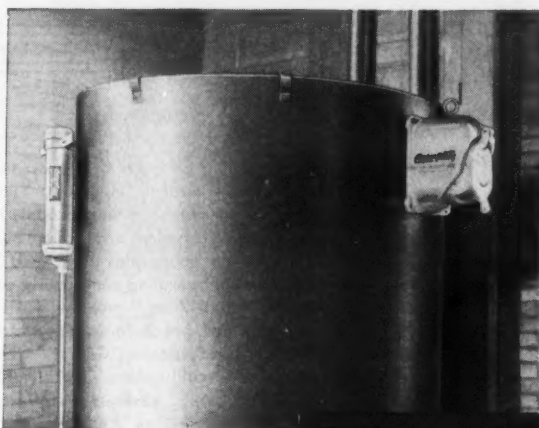
Spring deflections are converted into electrical signals by transducer and recorded. Instrument is entirely self-contained and operates on AC.

(Thermo-Grav is product of American Instrument Company, 8030 Georgia Ave., Silver Spring, Md.)

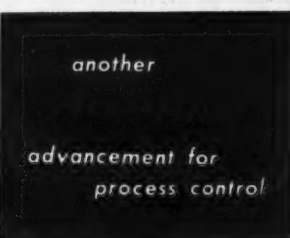
Check 6631 opposite last page.

AccuRay... TANK OR BIN LEVEL SYSTEMS

A Level Detector-Controller System Designed to your Requirements



Adaptable to four methods of operation, AccuRay's Detector-Controller offers outstanding advantages over other float-level control systems. It is easily installed and maintained and is priced from only \$465.00. The Detector-Controller utilizes two units—a radiation source housing, which provides more than adequate shielding, and a detector. Both units are mounted externally . . . thus are free from fouling by process materials. Accuracies can be maintained to $\pm \frac{1}{8}$ " as a high or low level alarm. The source housing can be pivoted to provide radiation shielding during work inside the tank. Design of the instrument is in accordance with accepted standards for both explosion-proof and weatherproof operations.



AccuRay® is a registered trademark of Industrial Nucleonics Corporation

High or Low Level Control . . . The detector is mounted diametrically opposite the radiation source. When the material moves above the level of the detector, the radiation is cut off, causing the output relay to change position. When the material drops below the level, the output relay is thrown to its opposite position. **Narrow Band Control . . .** The detector is mounted vertically along the tank, resulting in narrow band control. When the material moves above position (1), a signal is provided from the output relay. The opposite signal is provided when the material drops below level (2). **Wide Band Control . . .** A single source unit is teamed with two detector elements. The material can be controlled within the distance separating the high and low level detectors. The signal can also be used to provide a combination high-low level alarm system. **Extra-Wide Band Control . . .** Two source units are teamed with two detectors in cases where the vertical separation desired is large relative to the tank diameter. This system can also provide a high or low level alarm.

Also available is the AccuRay continuous tank or bin level measurement system . . . Continuous indication of the level of material is read directly from an indicator or recorder. The system may also be instrumented to provide automatic control of level.

Industrial Nucleonics

CORPORATION

1157 Chesapeake Ave., Columbus 12, Ohio

See the INDUSTRIAL NUCLEONICS' Exhibit — Booth 96, National Chemical Exposition in Chicago, September 9-12.

Please send complete details on AccuRay Tank or Bin Level Detector-Controllers.

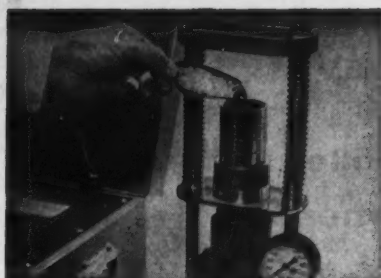
Name _____ Title _____

Company _____

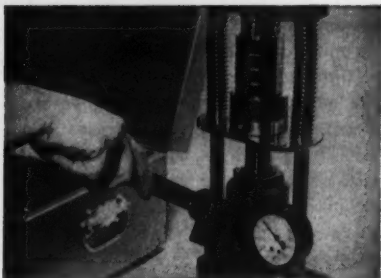
Street _____

City _____ Zone _____ State _____

Application _____



FEED IT...



SQUEEZE IT...



READ IT...

G-5 Moisture Register for accurate moisture tests in 60 seconds

Fastest moisture test available with accuracy to 0%. Save production and lab time—no skilled labor needed. Use Electronic Moisture Register G-5 anywhere on granular, ground, loose, shredded and powdered materials. Hydraulic pressure assures homogeneous sample. Specially calibrated for ammonium nitrate, ammonium sulphate, toilet soaps, calcium carbonate, sulphur, ammonium perchlorate, sodium bicarbonate, polyethylene resins, many more. Accuracy guaranteed. Ask for free trial.

Write, stating material to be tested, and moisture range, or check No. 5441 on reader service slip.

**ELECTRONIC
MOISTURE REGISTER**
Instruments

Moisture Register Co., Dept. CPC
P.O. Box 910, Alhambra, Calif.

Check 6633 opposite last page

INSTRUMENTS & LAB

Regulator guide

Bulletin of 28 pages contains section which spells out correct application of self-operating and pilot-type pressure regulators. Tables permit rapid comparisons of basic regulator characteristics. Bul 401 — Kieley & Mueller, Inc., 64 Genung St., Middletown, N.Y. Check 6634 opposite last page.

Electric desalter removes ions

Effectively takes out inorganic salts by dialysis

Uses: Effectively removing inorganic salts from sugars, organic and amino acids to prepare materials for chromatography.

Features: Electric desalter removes inorganic salts without significant loss of sample.

Description: Consisting of a power unit, an electro dialysis unit, and an electrolyte delivery flask, instrument will desalt solutions in approximately five to twenty minutes — depending on salt concen-



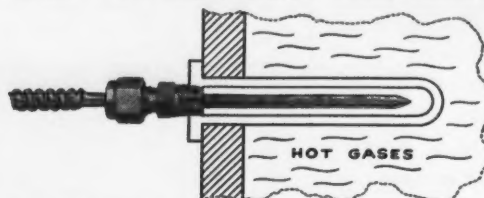
Electric desalter removes ions from solution

tration and quantity. Termination of process is indicated by mark drop in operating current.

Cations are removed from sample by reduction to metallic state on a mercury cathode. Anions are defused through a semi-permeable membrane and oxidized at a platinum anode. The products

Thermocouple Life Increased Up To 135 Times

With T-E's *Ceramo*® Construction



For measuring all types of process temperatures, T-E's "Ceramo" construction—ceramic insulation, metal sheathing—provides a tremendous increase in thermocouple life over conventional, open-end types. In a typical application, enclosed hot junction, 1/8" O.D. "Ceramo" thermocouples were used recently in a hydro carbon cracking unit operating continuously at 1616° F. "Ceramo" thermocouples lasted 7 to 9 months—while 14 gage bare wire thermocouples lasted but 2 to 14 days. And there was no significant difference in response. "Ceramo" thermocouples are available in all standard calibrations. Overall diameters—1/25" to 1-7/16".

Write for Bulletin 325-R

Thermo Electric Co., Inc.

SADDLE BROOK, NEW JERSEY

In Canada—THERMO ELECTRIC (Canada) Ltd., Brampton, Ont.

Check 6635 opposite last page

AUTO-LITE

Remote Indicating

Temperature Indicators
for **REMOTE READING**

Direct Mounting

Model F-1 temperature indicators are widely used in the chemical and food industries to cut waste and help preserve quality standards in processing and storage. Ideal for installation on any equipment, where accurate temperature is desired.

Solid liquid-filled movement... Large, easy-to-read dial... Equipped with 3-way adjustable bracket... Flexible tubing for remote reading or rigid stem for direct mounting... Wide choice of standard temperature ranges, from minus 60°F to plus 750°F. From \$23.50.

THE ELECTRIC AUTO-LITE COMPANY
INDUSTRIAL INSTRUMENT DIVISION
TOLEDO 1, OHIO
NEW YORK • CHICAGO • SARNIA, ONT.

Send for New Catalog

TEMPERATURE INDICATORS AND RECORDERS

Check 6636 opposite last page

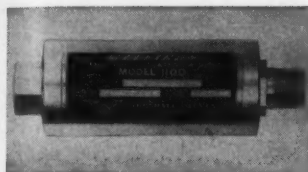
CHEMICAL PROCESSING

INSTRUMENTS & LAB

are then removed. Instrument is available with an alarm to signify when end-point has been reached.

(Electric desalter for chromatography is available from Schaar and Company, 7300 W. Montrose Ave., Chicago 34, Illinois.)

Check 6637 opposite last page.



Pressure switch . . .

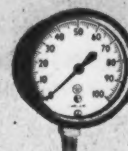
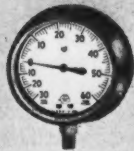
. . . for acids and highly corrosive materials can be used with concentrated hydrogen peroxide, fuming nitric acid, and fluorine at pressure settings from 2 to 4800 psi. Switches will operate in temperatures from -65 to 275°F. Proof pressures range from 224 to 6000 psi. Housing serves as pressure-tight safety capsule in case of break. SPDT switch elements are rated at 10 amps for AC and DC. Stainless steel models will withstand 2000°F heat for five minutes.

(Pressure switches are product of Pressure Switch Division, Barksdale Valves, 5125 Alcoa Ave., Los Angeles 58, Calif.)

Check 6638 opposite last page.

NEXT MONTH

How can you make best use of the latest instrumentation theory and equipment in this rapidly growing field? Highlight of fourth annual Process Instrumentation and Laboratory Equipment feature in the September issue is an analysis of this question by group of process, plant design, and instrumentation engineers. Read their answers — next month — along with in-plant installation articles and latest news on new instruments.



NOTHING BUT THE BEST IN GAGES FOR WORKING PRESSURES FROM 30" VACUUM TO 10,000 p. s. i.

These details of Helicoid gage design assure longer life and enduring accuracy

The superiority of Helicoid Gages is most evident in severe service—wherever a gage is subjected to violent pressure pulsations or severe mechanical vibrations.

The *sustained accuracy* of Helicoid Gages over *millions of cycles* is explained by the details of design and construction of the Helicoid movement shown at the right.

Rolling action of the cam facing against the roller surface . . . graphited Bakelite bushings, roller pivot base and cam facing . . . K Monel connecting links and screws . . . all such Helicoid features protect against wear and corrosion and assure sensitivity, sustained accuracy and trouble-free operation through millions of cycles.



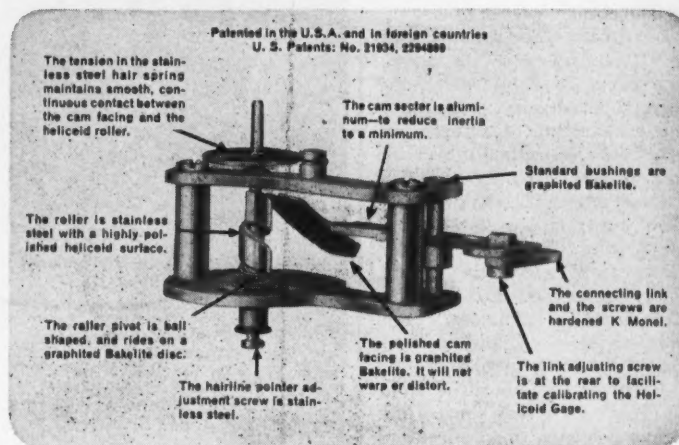
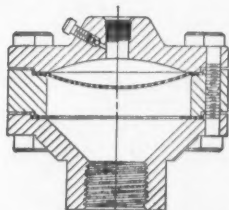
EASIEST ADJUSTMENT AND CALIBRATION

Only Helicoid Gages have the external pointer adjustment pictured here. The Helicoid type adjustment cannot be jarred out of position.

Calibration of Helicoid Gages is accomplished easily, without removing dial or pointer, because the link adjusting screw is at the rear of the system.

THE CHEMICAL GAGE

The Helicoid Chemical Gage has a guaranteed accuracy of plus or minus 1%. It is applicable for working pressures from 30" vacuum to 5000 p.s.i. and temperatures to 400° F. It is particularly suitable for chemicals and other viscous fluids which might clog or corrode a Bourdon tube. Pressure and/or vacuum is transmitted directly to the indicating gage element through deflection of a Teflon or Kel F sealing diaphragm. The indicating system above the diaphragm is filled completely with specific inert liquids.



TUBES BUILT FOR MILLIONS OF PRESSURE PULSATIONS

To fit the wide range of applications, Helicoid Bourdon tubes are available in four materials—alloy steel, K Monel, stainless steel and phosphor bronze.

All Helicoid tubes are made from seamless tubing and are carefully designed to give maximum torque and minimum stress. When used within the dial range, they will withstand many millions of pressure pulsations and will not stretch, leak or crack.



For complete information on the Helicoid line of gages write for Catalog G-52

**Helicoid Gage Division
AMERICAN CHAIN & CABLE**

929-P Connecticut Avenue • Bridgeport 2, Connecticut



Helicoid gives you all these features at prices that are competitive in the quality gage field

Check 6639 opposite last page

**Floatless level control
has no moving parts
in liquid**

For conductive liquids of low resistance

Uses: As floatless liquid level control for many acids, alkalis, water, and other liquids with resistance below 20,000 ohms.

Features: Electrode liquid level control has no moving parts in liquid. Current through electrodes is alternating. Electrolytic disintegration of electrodes is minimized by instrument design.

Description: Electrode liquid level controls are suitable for conductive liquids where resistance in electrode circuit does not exceed 20,000 ohms. This includes ordinary water, condensate, weak and concentrated acids or alkalis.

Controls are energized from alternating current source and draw 2 watts open circuited and less than 5 watts when closed. Current through electrodes is only a few milliamperes.

All contacts are of double-break bridge design and use 1/4"-diameter silver buttons. Ratings are 115v, 10 amps or 230v, 5 amps AC.

Damaged coils can be easily removed and replaced in field.

Enclosures available are water-tight, explosion-proof, and general purpose.

(Series T Electrode Liquid Level Controls are products of Charles F. Warrick Co., 1964 W. Eleven Mile Road, Berkley, Michigan.)

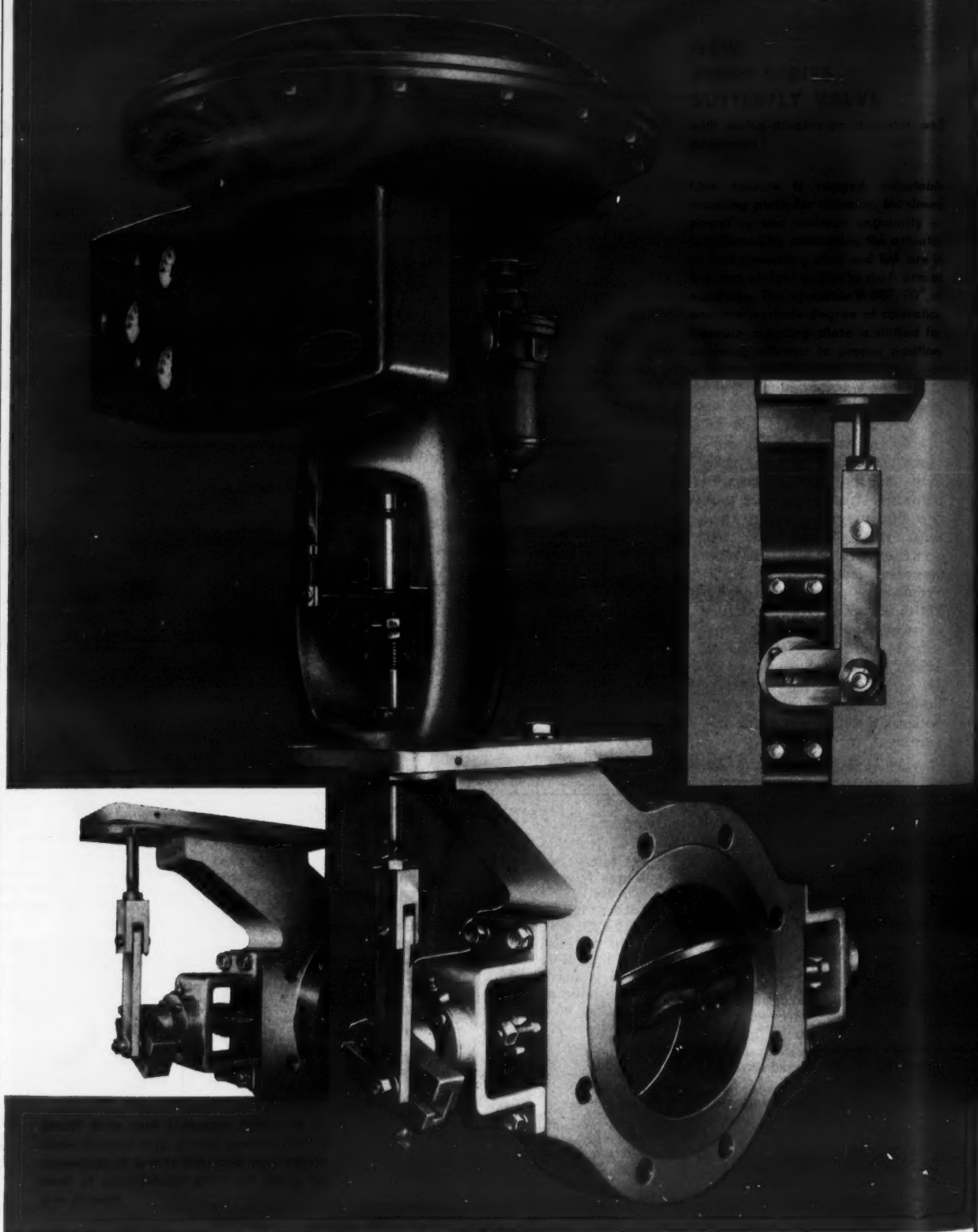
Check 6640 opposite last page.

X-ray microscope

Folder of six pages presents details on new instrument, said to be the first commercial X-ray microscope which determines the chemical composition of the specimen. X-ray Microscope Folder — Instruments Div., Philips Electronics, Inc., 750 South Fulton Ave., Mount Vernon, New York.

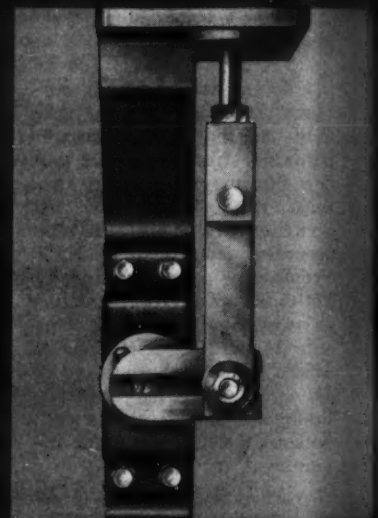
Check 6641 opposite last page.

MASON-NEILAN Develops...



**NEW
MASON-NEILAN
EXHAUST VALVE**
with water-tight design and
patented

This feature is rugged, self-cleaning, and provides positive, reliable operation. The valve is designed for use in a wide range of applications, from low to high pressure, and is available in a variety of materials and sizes. The valve is designed for use in a wide range of applications, from low to high pressure, and is available in a variety of materials and sizes.



A NEW DESIGN WITH NEW FEATURES IN BUTTERFLY VALVES

Now, a major advance in Butterfly Valve design! Mason-Neilan's new line of wafer type Butterfly Valves offers an outstanding combination of advantages for improved operation, simplified maintenance and reduced downtime.

The features in this Masoneilan Butterfly Valve line speak for themselves! Simple, attractive and rugged design, mounting flexibility, ease of adjustment, accessibility and maximum actuator power delivery.

Wide range of sizes now available. 32000 Series covers sizes from 2" to 24"; materials of cast iron, cast alloys, or flame cut carbon steel; ratings to 250 lb ASA iron and 300 lb ASA steel; and with Spring-diaphragm, Handwheel or Lever actuation.

Send for Bulletin or contact your nearest Mason-Neilan Representative.

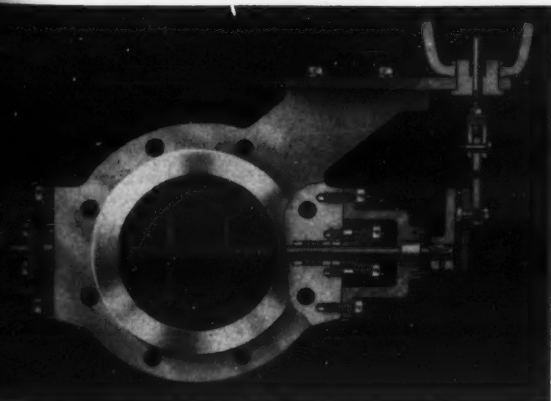
MASON-NEILAN

Division of Worthington Corp.

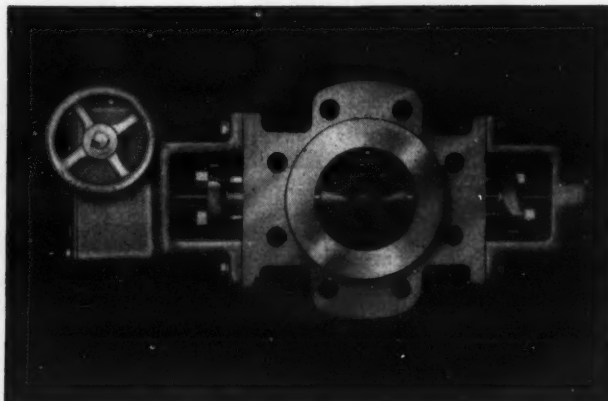
25 NAHATAN STREET, NORWOOD, MASSACHUSETTS

DISTRICT OFFICES OR DISTRIBUTORS IN PRINCIPAL U. S. CITIES

In Canada: Mason-Neilan Regulator Co., Ltd., Brantford, Montreal, Toronto



Maintenance is greatly simplified by bearing brackets sized to permit easy access to packing box and removal of self-centering packing gland and follower. Packing can be added without disassembly of brackets. Packing box may be lubricated, non-lubricated or purge type.



32000 Series Butterfly Valves are available with either Handwheel or Lever actuation. Handwheel types are supplied with a closed gear box, which includes indicator. When used with power actuator, declutching is provided. Travel stops are available.

Check 6642 opposite last page

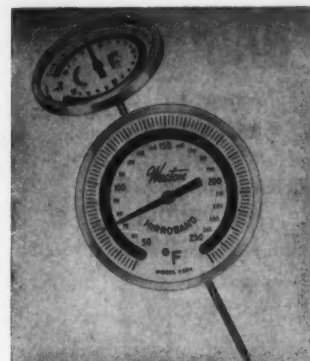
Testing thermometer has mirror scale

Eliminates parallax errors

Uses: As test or production thermometer.

Features: Thermometer eliminates parallax errors.

Description: Test thermometer is bi-metallic type. Com-



Mirror scale and knife-edged pointer permit precise temperature readings

combination of mirror scale and knife-edge pointer permits precise readings. Except for scale glass, unit is completely incased in welded stainless steel for resistance to most common acids and gases. Head is two inches in diameter, providing a scale length of four and one-half inches. Standard stem is eight inches long and is pointed to increase its usefulness.

Thermometer is available in six ranges with increments of 1, 2, or 5 degrees. Ranges are 25/125°F, -20/100°F, 50/500°F, -10/100°C, and 0/250°C.

(Model 2284 thermometer is product of Weston Instruments, Division of Daystrom, Inc., Newark 12, New Jersey.)

Check 6643 opposite last page.

Gage catalog

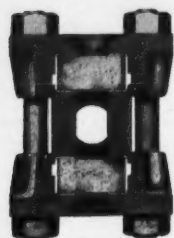
Valve manufacturer offers 48-page catalog covering line of pressure gages with ranges from 15 psi or 30" of vacuum to 20,000 psi. Cat G-58 — Kunkle Valve Co., 121 S. Clinton St., Ft. Wayne 2, Ind.

Check 6644 opposite last page.

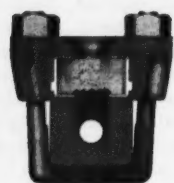
Strahman

HIGH PRESSURE GAUGES

USED IN
REFINERIES
AND
CHEMICAL PLANTS
THROUGHOUT
THE WORLD



THRU VISION



REFLEX

Single or Multiple
Sections

TUBULAR

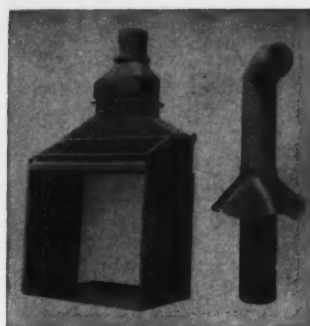
Gauge Cocks
Large Chamber
Reflex Gauges
Heated or Cooled
Gauges

SEND FOR
COMPLETE
CATALOGUE

STRAHMAN VALVES, Inc.
16 Hudson St., New York 13, U.S.A.

Check 6645 opposite last page

INSTRUMENTS & LAB



Polyvinyl chloride . . .

. . . laboratory hoods, especially useful wherever highly corrosive or radioactive materials are encountered, withstand a broad range of acids, alkalis, and organic media. Constructed entirely of polyvinyl chloride, the hoods are easily decontaminated by standard procedures and considered highly suitable for radioactive work.

(PVC hoods are product of Golden Plastics Company, 333 East Eighth Street, Oakland, California.)

Check 6646 opposite last page.



Metering pump . . .

. . . requires only one-third space previously needed. Packless pump has continuous flow characteristics through entire capacity range. Proportioning pump is adjustable while in operation, pumping at pressures to 2500 psi, and available with either Teflon-faced diaphragm or metallic bellows.

(McCannameter pump is product of Hills-McCanna Co., 4571 W. Touhy Ave., Chicago 30, Illinois.)

Check 6647 opposite last page.

CRESCENT POLYETHYLENE MULTITUBE

Special Types of Cabled Instrument Tubing
to meet your specific need

These types employ HIGH MODULUS, high density polyethylene tubes made from new low pressure process polyethylene. Four to nineteen tubes of 1/4" OD are SPIRALLY CABLED together under heavy protective coverings which are designed to meet the unusually severe installation requirements with lowest cost.

TYPE XPT-U

Underground and General Purpose Type
Designed for direct earth burial or use in underground conduit and for above ground where subject to moderate mechanical abuse. Tubing is protected by a thick, tough polyvinyl chloride (PVC) sheath resistant to impact, corrosion and flame.

TYPE XPT-F

Flash Fire Resistant Type
A thick PVC sheath, heavy asbestos braid and overall PVC sheath over the tubing assembly provides several minutes of time delay for shutdown in the event of a flash fire. This construction also gives adequate protection from welding and cutting metal splash.

TYPE XPT-FA

Flash Fire Resistant - Armored Type
For complete mechanical protection, the tubing, thick PVC sheath and heavy asbestos braid are covered by an interlocked, galvanized steel armor. Designed for dry locations, type XPT-FA also gives several minutes of time delay in the event of a flash fire.

Send for NEW BULLETIN 458-E with complete information.

CRESCENT INSULATED WIRE & CABLE Co.

TRENTON, N. J.

Check 6648 opposite last page

How to silence 38 stories of piping

In the new Seagram Building in New York, Williams-Hager Silent Check Valves control water hammer. They silence and protect piping by operating instantly when flow reversal starts or when flow is zero. Just one of hundreds of outstanding buildings protected by Williams-Hager Valves.

Write for Bulletins

—No. 654 on Valves, No. 851 on Cause, Effect and Control of Water Hammer



Figure 329 Valve, center-guided type.

WILLIAMS • HAGER

Silent
CHECK VALVES

THE WILLIAMS GAUGE CO., Inc.
146 Stanwix St. • 2 Gateway Center • Pittsburgh 22, Pa.

Our 72nd Year • 1886-1958

Check 6649 opposite last page

CHEMICAL PROCESSING

Fig 1 — Cast zirconium pump impeller
after one year service in HCl, $ZrOCl_2$,
HCNS, and trace Fe salts



highly aggressive solutions can't hurt zirconium castings

Pump impellers, 50 diaphragm valves, and other items withstand conditions about as severe as could be encountered anywhere in chemical processing — preventing contamination as well as corrosion

Zirconium castings are giving excellent service at the zirconium-hafnium separation plant of Wah Chang Corporation, Albany, Oregon. One example of good results achieved is the experience with a 6"-diameter, semi-open pump impeller cast of zirconium. This impeller has been used in a solution containing zirconyl chloride, hydrochloric acid, thiocyanic acid, 500 ppm iron, and some ketone solvent at room temperature.

From a careful examination of this impeller after one year's service, Fig 1, it is estimated that the part should be good for at least 10 years in this particular application.

Diaphragm Valves

Among other zirconium equipment used at the plant are 50 one-inch cast zirconium Saunders diaphragm valves, Fig 2. These valves are being used to control a variety of corrosive solutions such as hydrochloric acid containing 100 g/l of ZrO^{++} , 140 g/l of Cl^- , 60 g/l of NH_4^+ , and 180 g/l of CNS $^-$.

These cast zirconium valves also handle 2.5 molar sulfuric acid solution containing 10 g/l

HfO^{++} , 3 g/l CNS $^-$, and 5 g/l Cl^- . In another area they come in contact with methyl isobutyl ketone solution containing 24 g/l of ZrO and 60 g/l of CNS. Valves also are used for 32% hydrochloric acid.

Other Zirconium Equipment

Cast zirconium extraction column support plates are also in use at Wah Chang. These plates are the bottom members of extraction columns used in the zirconium-hafnium separation process. Cylindrical tube is a centrifugally cast pipe of zirconium which has been welded to the 13"-diameter cast zirconium plate, and serves as the solvent inlet riser. Hydrochloric acid, sulfuric acid, and methyl isobutyl ketone solutions, similar to those handled by the valves, come in contact with the support plates.

Three agitator hubs in use, weighing 43 lb each, are believed to be the largest shaped-zirconium castings that have ever been made. One other design of hub in use consists of two zirconium castings welded together.

The cast zirconium hubs are used as corrosion-proof stubs to pass through packing

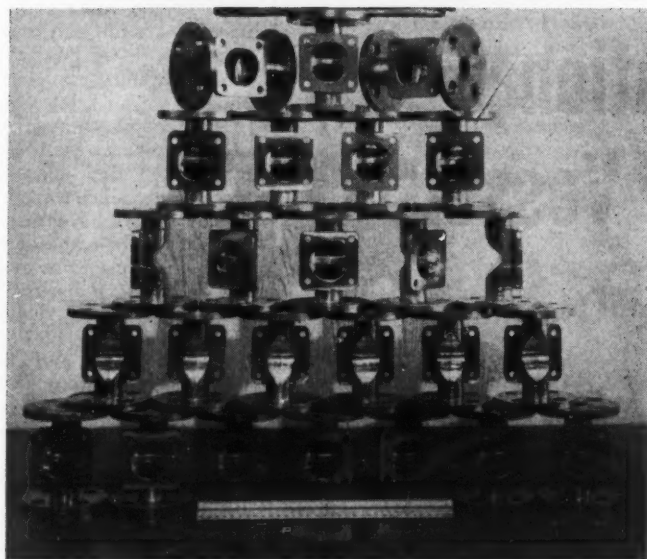


Fig. 2 — Cast zirconium bodies for diaphragm valves

What lead does to control corrosion in producing and storing Phosphoric Acid

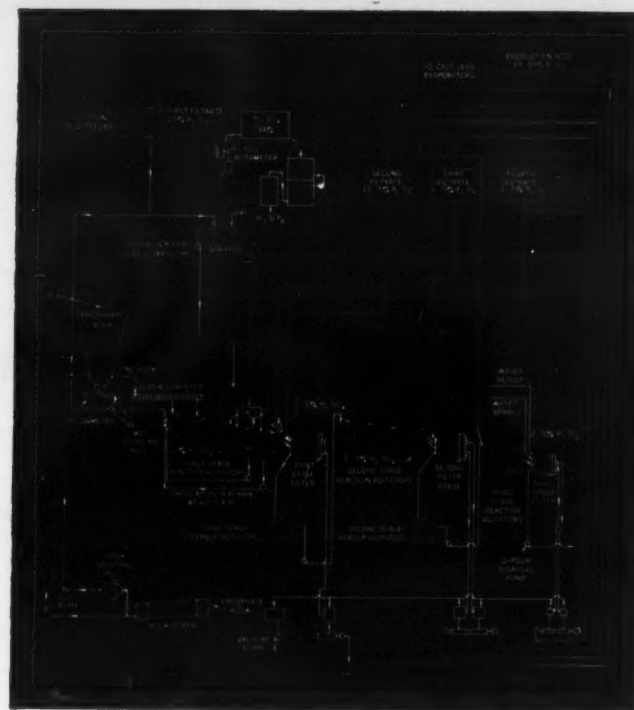
H_2SO_4 and P_2O_5 are a hungry pair.

They eat right into most metals. But *lead* takes the sharp edge off their hunger quickly.

With each of these chemicals, *lead* reacts on contact to form on the surface of the metal an insoluble and impervious film. This film stops further corrosion.

That's why *lead* has long been a "first choice" material in much of the equipment used for treating phosphate rock with sulfuric acid to produce phosphoric acid. It is used for lining vessels and tanks, in piping and pumps, in evaporator coils and for raking blades in agitators.

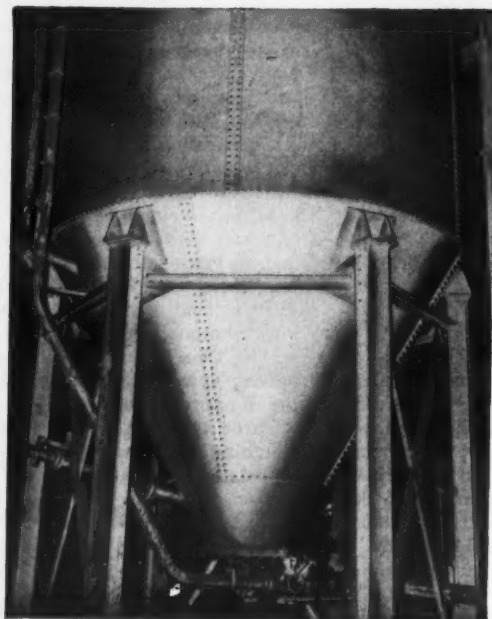
Recently new forms of cage-type sheet *lead* structures, new bonding and strap-lining methods, new constructions for high-temperature erosion-corrosion service and automatic stud welding techniques, have increased *lead's*



usefulness . . . not only in phosphoric production but in many other applications.

What about *lead* for your own acid handling equipment...considered in the light of these new techniques! It's something to think about, and . . .

When you think of Lead . . .



think of National Lead Pressure Vessels

...lead-lined to last

Today, National Lead weds *lead* to steel . . . not only in pipe (Tubond®) and fittings (United®) but in massive and complex process and storage and shipping vessels, as well. In this equipment, the union is stronger than the tensile strength of *lead*. Bonded lead linings minimize troubles from vibration and severe and rapid cyclic temperature and pressure changes which can result in blistering, buckling and cracking. Creep is virtually eliminated.

In view of this and other developments, you may want to review your position on *lead-lined* tanks, stills, scrubbers, filters, piping, valves and other corrosion resisting equipment. If so, contact National Lead Company, Lead Lined Products, 111 Broadway, New York 6, N. Y.

CORROSION CONTROL

glands of Haveg- or glass-lined tanks. Solutions handled include zirconyl chloride solutions at 70-140°F and zirconyl chloride solution at 190°F containing 38 g/l H_2SO_4 .

Plant is using dip pipes made of centrifugally cast zirconium pipe welded to zirconium flanges. Zirconium thermowells are also in use. Both of these items encounter the same solutions as the agitator hubs. Jet nozzles and throats cast in zirconium are used for dilute hydrochloric acid containing other corrosives.

Advantages Obtained

Elimination of corrosion through the use of zirconium equipment helps plant maintain its continuous operation and avoids product contamination. In the zirconium purification process, zirconium is separated from hafnium by liquid-liquid extraction. These two metals are so similar in chemical behavior that even trace amounts of contaminants in the process stream will adversely affect the entire operation. As final product purity is measured in parts per million, and since high recovery ratio of the rather expensive process chemicals is highly desirable, materials of construction must be carefully chosen.

Plant employs over a mile of glass pipe as well as polyethylene, Teflon, glass-coated steel, high silicon iron, high nickel alloys, Karbate, and Haveg where conditions require their use. However, for the applications discussed, zirconium appears to be the best choice based on life expectancy, initial cost, and elimination of contamination. Ready availability of castings enabled Wah Chang engineers to utilize zirconium in many shapes and sizes throughout the plant.

Zirconium castings have only been available a relatively short time. Zirconium metal was originally developed for use in nuclear reactors and most of it is still used for that purpose. As the corrosion-resistant properties of zirconium became better known, its value in the chemi-

Check 6650 opposite last page

CORROSION CONTROL

cal field was evident. Zirconium equipment was originally made by the costly method of fabricating from ingot or sheet. Availability of zirconium castings lowers the cost of equipment made from it and broadens its application in the chemical field.

(Zirconium castings are product of Oregon Metallurgical Corp., PO Box 484, Albany, Oregon.)

Check 6651 opposite last page.

(Zirconium sponge used in castings is product of Wah Chang Corporation, Albany, Oregon.)

Check 6652 opposite last page.

(Zirconium diaphragm valves are product of Hills-McCanna Co., 4600 West Touhy Ave., Chicago 30, Ill.)

Check 6653 opposite last page.

Corrosion rate cut 40% by inhibitor added to ammoniating solution

Inhibitor now being added to manufacturer's ammoniating solution results in at least 40% less corrosion than any of more than 150 inhibitors tested. While laboratory tests can not be directly interpreted to mean 40% longer service life for equipment, it should definitely help prolong life of conventional steel tanks, dip pipes, lines, and spargers and other equipment used by the fertilizer mixer.

(Spensol Green ammoniating solution is a product of Spencer Chemical Co., Dwight Bldg., Kansas City 5, Mo.)

Check 6654 opposite last page.

Pump resists corrosion

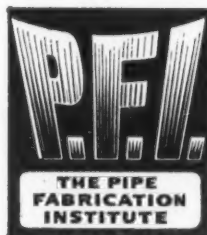
Centrifugal pump with rubber-synthetic lining is subject of four-page bulletin, which points out construction features, lists dimensions, and shows typical characteristics in series of performance curves. Bul P-6-258 — Ampco Metal, Inc., Milwaukee 46, Wis.

Check 6655 opposite last page.



"ALL I WANT IS YOUR P.F.I. Standards"

- 1 Machining Backing Rings for Butt Welds
- 2 Dimensioning Welded Assemblies
- 3 Linear Tolerances Bending Radii
- 4 Shop Hydrostatic Testing
- 5 Cleaning Fabricated Piping
- 6 Built-up Weld, Metal Bosses
- 7 Welded Nozzles—Spacing
- 8 Preheat-Postheat Before, After Welding
- 9 Arc-Welding Dissimilar Ferritic Steels
- 10 Stress Relieving Practices



Sure, it's a crime to hold someone up for something valuable. But, it's no crime to want a complete file of P.F.I. Standards compiled and published by the Engineering Standards and Metallurgical Committees.

While these Standards are packed with vital data on the design, fabrication and erection of industrial and high pressure—high temperature piping, they do not explain the many advantages of shop fabrication.

Shop fabrication by firms responsible for the development of P.F.I. Standards is your real assurance of meeting the most exacting requirements of piping, whether it's welded, bent, coiled or vanstoned... in any metal as a component or a complete assembly.

Write for all ten P.F.I. Standards or indicate in the coupon below which ones could be helpful to you.

THE PIPE FABRICATION INSTITUTE

Devoted to the Technical and Economic Problems in Piping

ONE GATEWAY CENTER, PITTSBURGH 22, PA.

Please send me the P.F.I. Standards indicated

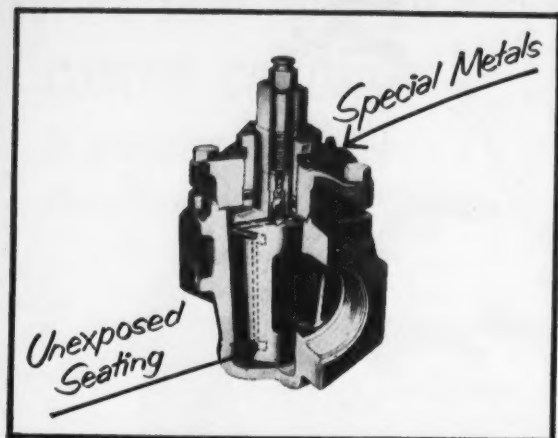
1 2 3 4 5 6 7 8 9 10

Name _____

Company _____

Address _____ City _____ State _____

Check 6656 opposite last page



ROCKWELL-Nordstrom VALVES CUT VALVE CORROSION COSTS TWO WAYS

By specifying Rockwell-Nordstrom lubricated plug valves, you'll have two-way protection against the high cost of valve corrosion.

1. Rockwell-Nordstrom valves have completely unexposed seating areas that can't be corroded or eroded by line fluids. Pressurized lubricant forms a continuous, instantly replaceable "soft seal" for positive shut-off.

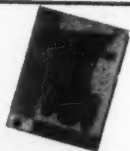
2. A complete selection of semi-steel, steel, 316 stainless, Monel, bronze and other corrosion resisting metals means you'll have just the right valve for the right service.

Rockwell-Nordstrom lubricated plug valves are available in a complete range of sizes and pressures for every process industry need. They cost no more to buy, often less, than ordinary valves.

For details, see your supplier or write: Rockwell Manufacturing Co., Pittsburgh 8, Pennsylvania.

Canadian Valve Licensee: Peacock Brothers Limited.

SEND FOR NEW, FREE BOOKLET ON
CORROSION-RESISTANT ROCKWELL-
NORDSTROM VALVES... JUST CHECK
ITEM 6657 ON THE REPLY SLIP



ROCKWELL-Nordstrom VALVES

it's **ROCKWELL** 
MANUFACTURING COMPANY

Check 6657 opposite last page

CORROSION CONTROL

**Tapered pipe flanges
lined with Teflon
stop corrosion**

Not affected by thermal shock

Uses: As reducers in pipe system.

Features: Reducing flanges are lined with virgin Teflon compound. Full face of flange, with its asbestos backing, is an integral part of liner, providing corrosion protection and chemical inertness. Material being conveyed does



Material being conveyed cannot contact metal anywhere in Teflon-lined reducing flange assembly

not contact metal anywhere in reducing flange assembly. Thermal shock has no effect on reducers because of forming process which compensates for the thermal expansion and contraction differential between the liner and housing. Liner itself is semi-flexible.

Description: Flow passage of reducing flanges is tapered in design to minimize turbulence. Reducer withstands 150-lb pressure and full vacuum at temperatures ranging from -100 to 500°F. Flanges have standard 125- or 150-lb ASA bolt circles. They are available in 1 to 6" ASA pipe sizes. Reduction ratios are generally in one-size steps.

(Fluoroflex-T reducing flanges are products of Resistoflex Corporation, Roseland, N. J.)

Check 6658 opposite last page.

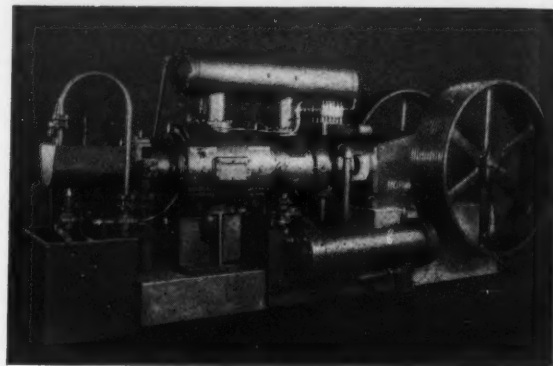
**Acetone withstood
by ducts, hoods,
and fans**

Uses: For handling solvents and corrosives.

Features: Resin used for fabrication of ducts and other products has good resistance to alkaline materials, many

NORWALK

HIGH PRESSURE COMPRESSOR



The five stages on this heavy-duty tandem compressor require less horsepower and develop less heat than in four stages in producing 3000 lb. per square inch pressure in capacities up to 31,000 cfh.

Frames with double row roller bearings, reversible ring plate valves, force feed lubrication, generous intercooler coils are some of the features that make this horizontal compressor compact, sturdy and efficient to operate and maintain.

Every Norwalk compressor is test-run for eight hours at the factory, then taken down for complete inspection before re-assembly and shipment.

Norwalk makes compressors from single stage to six stages, from 125 to 25,000 lb. psi. Catalog on request.



NORWALK COMPANY, INC.

SOUTH NORWALK, CONNECTICUT

Established 1864

Check 6659 opposite last page

CHEMICAL PROCESSING

CORROSION CONTROL

acids, and solvents. Samples boiled in acetone for 12 hours gained only about 0.3% in weight.

Description: Line of ducts, hoods, fans, and other products is fabricated from material based on furfuryl alcohol resin. It offers corrosion control over elements that proved to be difficult for other plastics to handle.

(Furfuryl alcohol resin hoods, duct, and fans are manufactured by du Verre, Inc., 374 Delaware Ave., Buffalo, N.Y.)

Check 6660 opposite last page.

Inhibitors extend use of stainless handling corrosive solutions

Reduce attack of sulfuric and fuming nitric acids

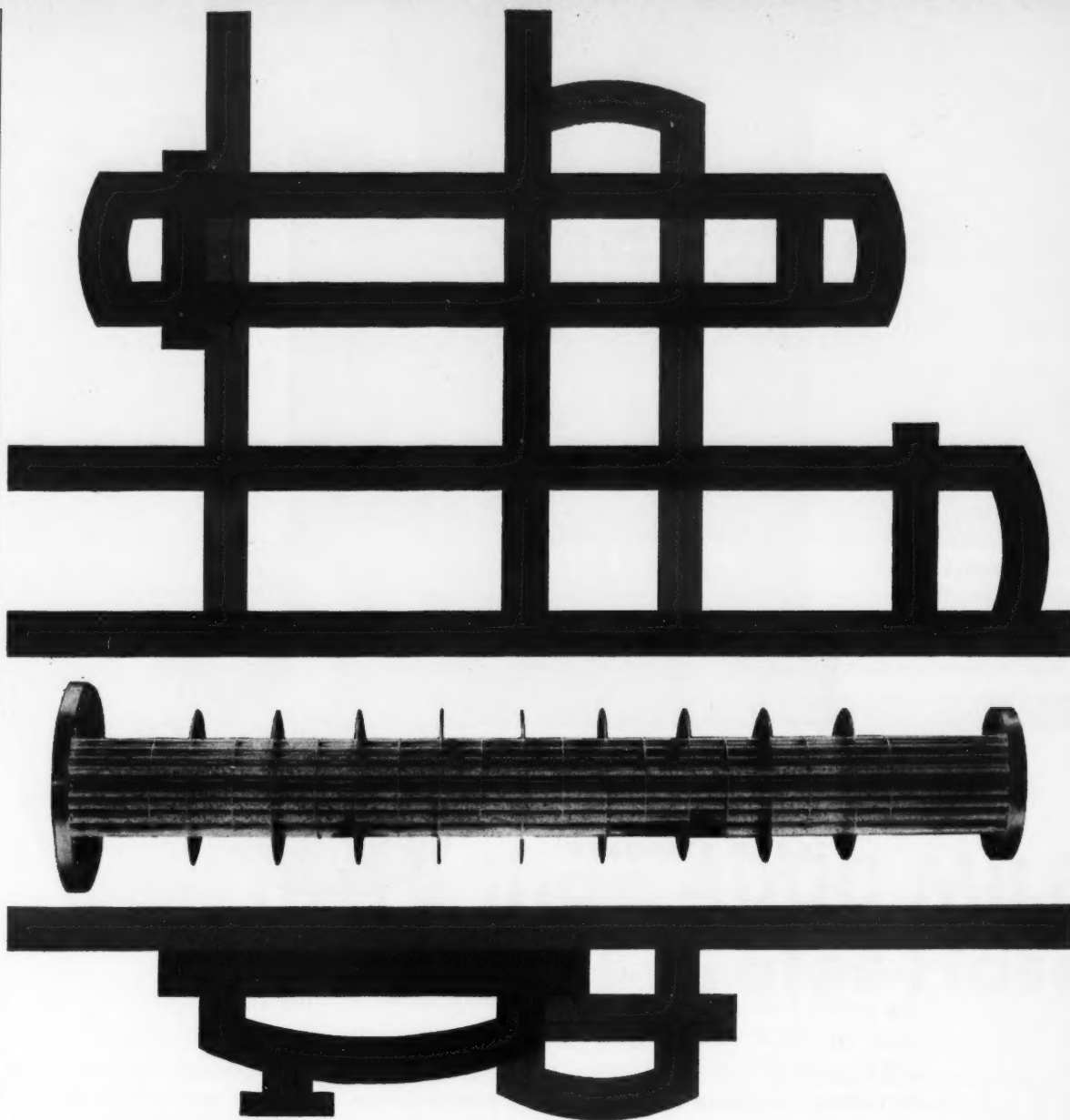
Small amounts of inhibitors can effectively retard rate of attack on stainless steel or completely protect it from damage by corrosives. For example, action of H_2SO_4 on 304 and 316 stainless is lowered appreciably by addition of metallic sulfates or oxidizing agents such as copper sulfate or chromic acid.

In pickling copper and brass, using H_2SO_4 at 8 to 10 or even 20% and temperatures from 140-180°F, copper sulfate in pickling baths makes prominent use of stainless equipment possible.

By maintaining sufficient alkalinity of sea water ballast with automatic injection of sodium hydroxide, 304 stainless used in seagoing gasoline storage tanks remained unaffected for five years. Inhibiting effect of NaOH on brine has proven valuable in refrigeration.

Recent lab tests indicate that small amounts of HF in fuming HNO_3 materially reduce corrosion of stainless. Proper control of this important oxidizer for liquid-fuel rockets will permit use of stainless steels to greater advantage.

(From a technical report prepared by Grant L. Snair, Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pennsylvania.)



win the fight against corrosion—with Alcoa Aluminum

Here's a \$100-million example. The refining industry's requirements for heat exchanger tubes are 40 ft per barrel of capacity. Some 30 ft of this requirement involves exchanger applications in which Alcoa has proved aluminum is ideal. By using aluminum tubes in all those applications, the refining industry would have saved approximately \$37 million in original capital investment. Capitalized at the refining industry's normal rate of return, that saving would

be worth about \$100 million over a 10-year operating period.

Don't shovel good money after bad by reinstalling unsuitable material. Over 30 years' experience in the process industries has given Alcoa engineers full knowledge of the aluminum alloys and installation methods by which corrosion can be eliminated. Put their knowledge to work for you. Outline your corrosion problems in a letter to ALUMINUM COMPANY OF AMERICA, 902-H Alcoa Building, Pittsburgh 19, Pa.


"ALCOA THEATRE"
Exciting Adventure
Alternate Monday Evenings



Specify Alcoa Aluminum for
corrosion-free Process Equipment
Pipe & Tube
Tanks, Containers, Trucks & Cars
Plant Structures

Check 6661 opposite last page

IMMEDIATE DELIVERY...

**ESCO IPS
SCREWED
FITTINGS**

**CAST STAINLESS STEEL
150 LB. STANDARD**



ESCO cast stainless fittings are a vital part of every corrosion resistant piping system. Cast with heavy wall sections and in a variety of analyses, *ESCO* screwed fittings are carried in warehouse stocks in sizes ranging from 1/8" to 4". Complete size range is available in 90 and 45 degree elbows, tees, crosses, unions, couplings, reducers, plugs, bushings and locknuts. Permanent alloy identification is cast in

each fitting to eliminate replacement error.

Special sizes, types and alloys can be made to engineering specifications.

ESCO cast stainless fittings are available from convenient warehouse stocks. See your nearest *ESCO* dealer. He can help you solve your corrosion problems. Ask for *ESCO* Catalog No. 156 giving complete dimensional data.

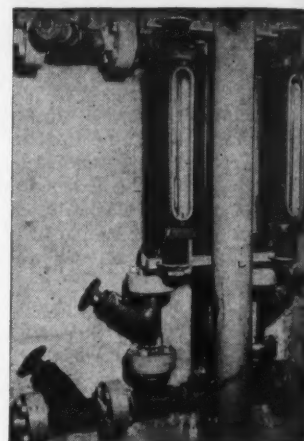


**ELECTRIC STEEL
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MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.
Offices in Most Principal Cities
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IN CANADA ESCO LIMITED

Check 6662 opposite last page

CORROSION CONTROL



Trouble-free performance

... of PVC valve in concentrated sulfuric acid line to chlorine dioxide reactor at Harmac Pulp Division of MacMillan & Bloedel Limited, Nanaimo, B.C., Canada, solved the problem of high maintenance costs. Since installation of the PVC valves, failure of valve seats and bodies is a thing of the past. Replacements caused by corrosion have been completely eliminated because polyvinyl chloride is not affected by mill chemicals and industrial corrosives.

Maintenance costs have been cut to a very reasonable and satisfactory level through use of these valves. Operating at pressures to 125 psi and temperatures to 140°F, valves also withstand low temperatures without becoming brittle.

(PVC valves are product of Lunkenheimer Co., Beekman and Waverly Sts., Cincinnati 14, Ohio.)

Check 6663 opposite last page.

Details epoxy finishes

Chemical and physical properties of various epoxy finishes are described in four-page bulletin which offers valuable data on the selection and application of epoxy films for steel, concrete, and wooden bases. Epoxy Finishes Bul — Hauger-Beegle Associates, Inc., 900 West 49th Place, Chicago 9, Ill.

Check 6664 opposite last page.

**THAT'S
INTERESTING**

**Airborne
atoms**

After being tested in almost 50 experimental B-36 bomber flights, airborne nuclear reactor is now at Oak Ridge for joint AEC-Air Force study of radiation patterns.

Reactor was operated over unpopulated areas only during flights. (Industrial Research Newsletter, Armour Research Foundation)

**Straw hat —
or is it?**

This year many a traditional straw "boater" won't be straw at all. Though looking like straw, the hats will actually be man-made fiber. Virtually crush-proof, they weigh a scant two and one-half ounces — about half the weight of conventional hats for summer.

They resist spotting and won't fade under hot sunlight either. (Chemical News, Manufacturing Chemists' Association)

For more information on product at right, specify 6665 see information request blank opposite last page.



You find Gates Hose where anything flows
St. Lawrence Seaway — one of the biggest construction jobs in the world — employs thousands of feet of Gates Type 19B Hose. Shown here is Long Sault Dam.

(PHOTO COURTESY NEW YORK POWER AUTHORITY.)

Industry has in use today more than **4000 MILES** of **Type 19B*** Gates Hose

...and industry all over the world uses equally impressive amounts of the air, water, steam, suction and many other hoses in the full range of types and sizes made by Gates.

Back of this world-wide acceptance is a continuing program of *specialized* hose research at the multi-million dollar Gates Research Center staffed by more than 200 chemists, physicists, engineers and technicians.

It is the aim of this *specialized* research to increase hose utility and life, and to lower industry's annual hose costs.

Because Gates Hose is so widely preferred, it is quickly available from leading distributors in all industrial centers in the United States, and in 90 countries throughout the world...and its outstanding performance is guaranteed by the **World's Largest Maker of V-Belts.**

***Gates Type 19B Hose carries air, water, coolants, oils, greases, gasoline, kerosene, or solvents. This popular hose—one of many in Gates full line—is always available from your nearby Gates Distributor.**

The Mark of *Specialized* Research



The Gates Rubber Company • Denver, Colorado

TPA 335

Gates Industrial Hose

Made in a Full Range of Types and Sizes

CHEMICAL PUMP

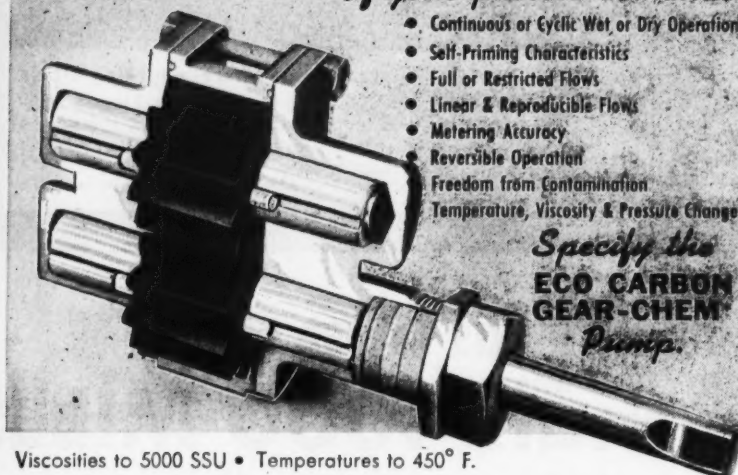
Can Run Dry

Continuous or Intermittent Service
Handled By ECO GEAR-CHEM* Pump.

If your process demands:

- Continuous or Cyclic Wet or Dry Operation
- Self-Priming Characteristics
- Full or Restricted Flows
- Linear & Reproducible Flows
- Metering Accuracy
- Reversible Operation
- Freedom from Contamination
- Temperature, Viscosity & Pressure Changes

*Specify the
ECO CARBON
GEAR-CHEM
Pump.*



Viscosities to 5000 SSU • Temperatures to 450° F.

Carbon spur gears are fully machined and ground, dimensionally stable and resistant to mechanical and thermal shock. Chemically unaffected by a wide range of corrosive media, carbon gears efficiently handle lubricating and non-lubricating fluids. Pump can be steam or chemically sterilized. Self-lubricating carbon bearings eliminate all problems of product contamination.

The carbon gear pump is available in 2 sizes: to 2.5 gpm at 100 psi at 1750 rpm and to 10.0 gpm at 100 psi at 1750 rpm. Pump housings and shafts of Type 316 or Carpenter 20 stainless steel, nickel or Hastelloy C.

Write for complete data and state your requirements for immediate attention.

*Registered Trade Mark

ECO

the big name in small pumps

MARKet 4-6565

ENGINEERING CO.

12 NEW YORK AVE.
NEWARK, N. J.

Check 6666 opposite last page

CORROSION CONTROL

**Coatings stop corrosion;
resist abrasion,
impact stress**

Said to be unusually resilient

Uses: As coating in chemical plants, on off-shore oil rigs, pipe lines, salt water craft and installations, pulp and paper mills; as tank truck and tank car linings, on processing vats or tanks.

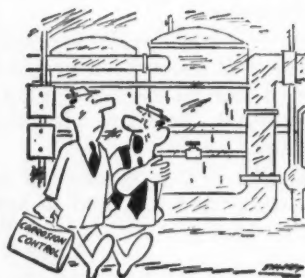
Features: Coatings provide outstanding resistance to alkalis, acids, solvents, salt water and salt spray, humidity, and vapors. They are said to be unusually resilient. Possessing a high degree of adhesion to metal surfaces, coatings tend to stop corrosion creepage, and resist abrasion and impact stress.

Description: Epoxy-resin coatings are available in primers and enamels. There are three basic types: cold curing catalyzed, air drying, and heat curing or baking. Coatings can be applied by brush, spray, dip, and roller-coat as easily as conventional enamels.

They are available in wide range of colors and in rust-inhibitive pigmented primers and sealers.

(Koropon coatings are product of United Wallpaper Inc., 1350 South Kostner Ave., Chicago 23, Ill.)

Check 6667 opposite last page.



"Ours is a continuous process operation. We're continuously replacing the plant."

Thanks to Tom Blakley, Florida East Coast Fertilizer Co., Homestead, Fla.

For Chemical Process Industries

LUZERNE CHECK LIST

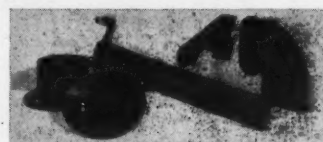
Of Complete Corrosion-Resistant Materials, Equipment and Services

☒ PVC & OTHER CUSTOM MOLDED PLASTICS



Specializing in intricate, heavy parts; metal inserts molded in.

☒ HARD RUBBER, CUSTOM MOLDED



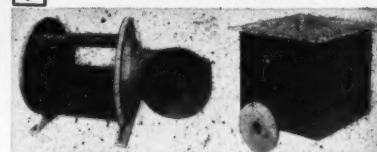
New uses, new compounds of this reliable chemical-resistant material.

☒ PVC FABRICATIONS & ROLL COVERING



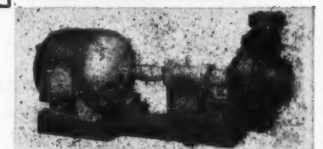
Unlimited applications and versatility for this fine plastic—rigid polyvinyl chloride.

☒ HARD RUBBER & PVC LINING



Complicated castings, also pipe, fittings and tanks lined to specification.

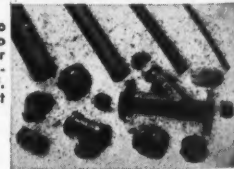
☒ HARD RUBBER PUMPS



New mechanical seal eliminates usual packing troubles.

☒ PVC & HARD RUBBER PIPE, FITTINGS & VALVES

PVC sizes 1/4" to 12", temperature to 140° F. Hard rubber sizes 1/4" to 8", temperature to 225° F. in heat-resistant Buna-N.



Write for complete information or contact our sales representative nearest you.

For ready reference look us up in Chemical Engineering Catalog

The LUZERNE RUBBER CO.

200 Mulrhead Avenue
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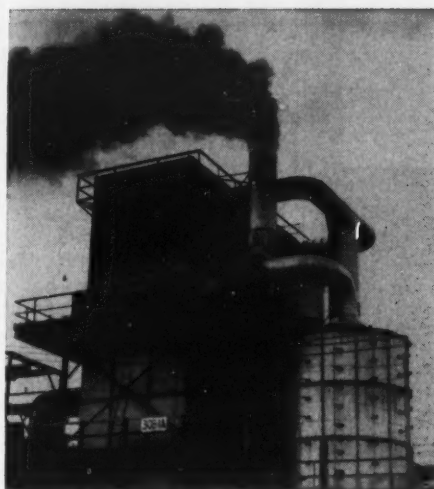
Trenton, N. J.
R. C. FOLTZ CO.
Houston, Texas

Check 6668 opposite last page

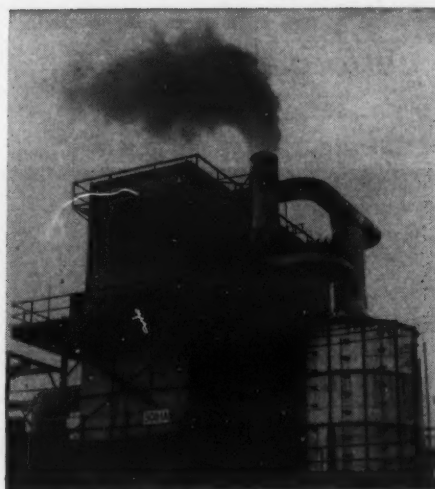
CHEMICAL PROCESSING



PROCESSING
EQUIPMENT



BEFORE — Fumes emitted from stack drew many complaints from neighboring community (stainless scrubber, shown not operating in this photo, can be seen at right)



AFTER — With the scrubber operating, plume is almost eliminated entirely. Acid mist removal is better than 90 percent

Whipping a serious community-relations problem,
stainless steel scrubber at Volunteer Ordnance
Works stops air pollution, resists corrosive
conditions, and . . .

Removes over 90 percent of H_2SO_4 from exhaust gases

TED F. MEINHOLD, Associate Editor
with **C. S. WILCOX**, Technical Supervisor
and **R. A. DIETRICH**, Technical Assistant
Volunteer Ordnance Works

Problem: Annoying fumes emanating from sulfuric acid recovery plant at Volunteer Ordnance Works, operated by Atlas Powder Co., Chattanooga, Tenn., brought numerous complaints from residents of the surrounding area. Investigations revealed that concentration of sulfuric acid often reached as high as 2824 mg of 100 percent H_2SO_4 per cubic meter of escaping mist.

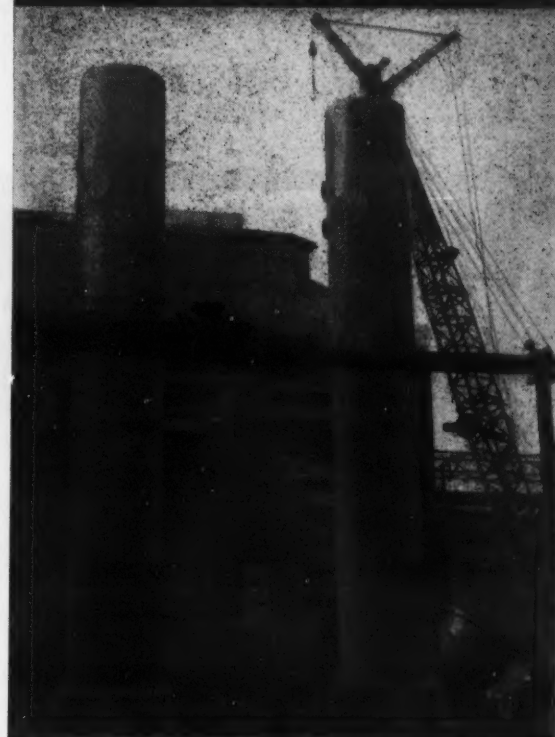
The recovery plant consists of two 200-ton per day drum-type acid concentration units. Hot gases are used to drive off water vapors. This vapor contained the acid mist that was exhausted to the atmosphere. Conventional fume-scrubbing

equipment had been installed of course, but this was not efficient enough to prevent the trouble.

Solution: A unit called a "fog-filter" was installed to supplement existing equipment. Scrubber consists of a cylindrical chamber 26' high and 14' diam made entirely of columbium-containing stainless steel. Unit is equipped with 12 vertical banks of water sprays. These are mounted in circular pattern, spaced 30 degrees apart. Total of 228 nozzles from 76 spray arms direct water discharge into a horizontal plane.

Acid is removed by centrifugal force and condensation. Gases enter unit at top, tangentially to outside wall, and are immediately subjected to 400 psi water spray. The small, high velocity water particles impinge on the mist particles, causing them to agglomerate. Water is fed into gas at total rate of 365 gpm from the 228 nozzles. Acid particles grow as

FABRICATED AND ERECTED BY



Primary gas coolers and towers being erected by The Youngstown Steel Tank Company in the coke department of a major steel producing company located in the Pittsburgh area.

The Youngstown Steel Tank Co.

Steel plate construction and erection is another important integral service we offer to complement our engineering, design and fabricating facilities.

Complete construction facilities are maintained for the erection of pressure vessels, storage vessels, stacks, structural bridges and buildings, plant maintenance and heavy machinery installation.

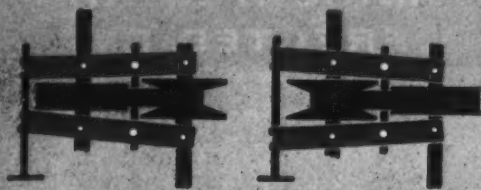
Offices are located in Youngstown, New York, Cleveland and East Chicago for your convenience. Please contact us when you require complete structural and plate steel fabricating and erecting services.



**The YOUNGSTOWN
STEEL TANK
COMPANY**

Youngstown, Ohio

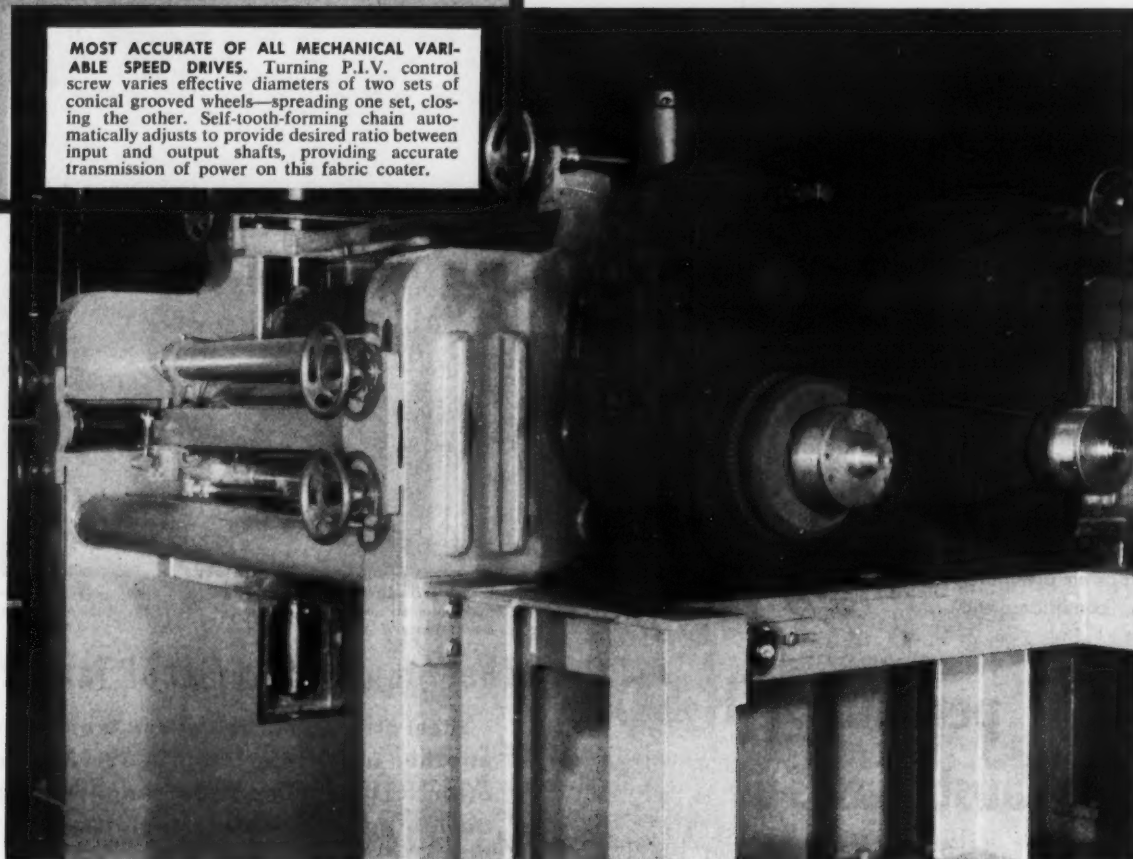
Check 6669 opposite last page



In principle . . .

in performance . . .

MOST ACCURATE OF ALL MECHANICAL VARIABLE SPEED DRIVES. Turning P.I.V. control screw varies effective diameters of two sets of conical grooved wheels—spreading one set, closing the other. Self-tooth-forming chain automatically adjusts to provide desired ratio between input and output shafts, providing accurate transmission of power on this fabric coater.



for positive, infinitely variable speed control

... there's nothing like P.I.V.

Here's a variable speed drive that is truly unique. Unlike conventional designs, Link-Belt P.I.V. with its all-metal chain drive is *not dependent on friction* for transmitting power.

P.I.V. permits fast, easy speed changing too. You can select any speed in its range—find it instantly, hold it indefinitely. No bother stopping the drive.

Because Link-Belt P.I.V. (Positive, Infinitely Variable) drives are fully enclosed, atmospheric conditions can't affect their efficiency. They're made in 8 sizes, 16 standard types. Ask your nearest Link-Belt office or authorized stock-carrying distributor for Book 2274.



LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants and Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

Check 6670 opposite last page

gas spirals down until particles are of sufficient size to be centrifuged against walls.

Gas takes 180-degree turn at bottom and enters exhaust stack. This sharp reversal of direction traps particles not grown sufficiently to be trapped previously.

Gases enter scrubber at temperatures as high as 225°F. Water sprays cool them to between 85 and 110°F. Water vapor entrained in hot gas stream condenses and removes appreciable amount of steam from exit gases, thereby almost entirely eliminating visible plume being exhausted from stack.

Results: The unit with its two acid removal actions, centrifugal and condensation, removes 90 to 93 percent of the acid mist from exhaust gases, solving the community's air pollution problem.

Supplementing the conventional fume scrubbing equipment, the fog filter keeps average sulfuric acid concentration in the exhausted mist to less than 100 mg per cubic meter. The high efficiency is maintained over a wide variation of acid concentration in the influent gas, ranging from 379 to 7943 mg per cu meter.

Although the fog filter's chamber has withstood the severe corrosive conditions existing in it, some difficulty was encountered shortly after startup with some of scrubber's auxiliary components. Entrained crystalline material caused unit's mild steel drain pipe to corrode within three days. Also, excessive heat in plastic-lined duct and exhaust fan caused deterioration of lining. Repairs were made with the same type of stainless steel used in the chamber. This has solved the problems.

(Fog-filter scrubbers are product of The R. C. Mahon Co., 6575 E. Eight Mile Road, Detroit 34, Michigan.)

Check 6671 opposite last page.

(Carpenter No. 20 cb stainless steel used in scrubber is product of Alloy Tube Division, The Carpenter Steel Co., Union, N. J.)

Check 6672 opposite last page.

PROCESSING EQUIPMENT

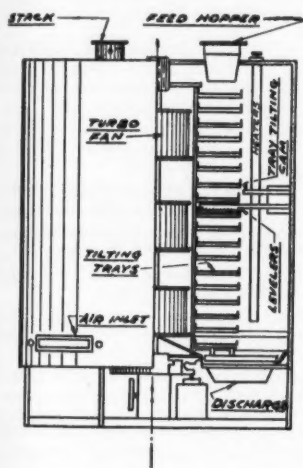
Dusty powders dried easily and efficiently in tilting-tray dryer

System designed to stop excessive dust losses

Uses: Drying extremely fine, powdery materials.

Features: Dryer's rotating system of tilting trays permit product to be dried successfully without excessive dust losses.

Description: The tilting trays are stacked in annular fashion around the dryer's fans which gently circulate air or gas drying medium over product on trays. As stack of trays rotate, individual trays of each shelf are successively caused



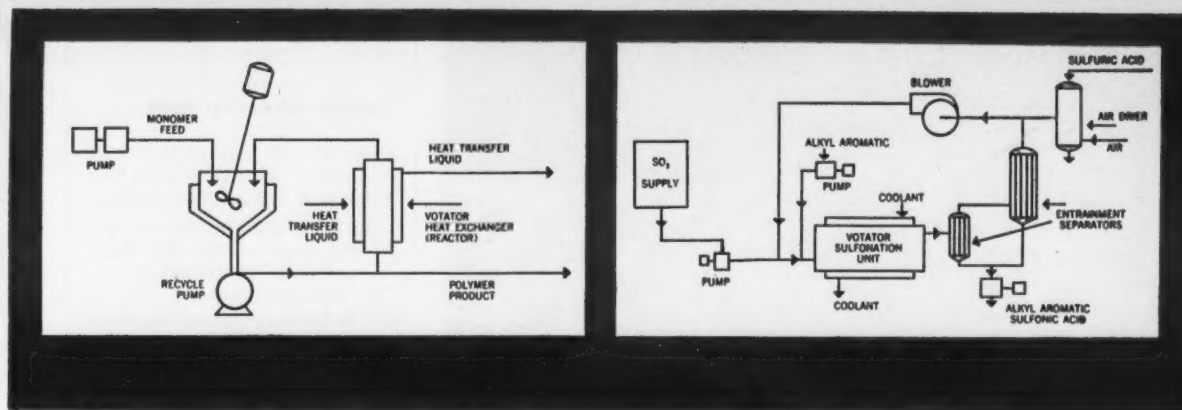
Tilting trays are stacked in annular fashion around dryer's fans which circulate drying medium over product on trays

to tilt. This is done slowly and gradually as shelves pass a stationary cam, thus sliding contents onto next lower shelf of the dryer.

Product is transferred at a controlled rate through a closely controlled environment without loss due to dispersion or entrainment in the drying medium. In some cases, unit can serve as combination dryer and reactor.

(Tilting-tray Turbo-Dryer is product of Wyssmont Company, Inc., Long Island City, New York.)

Check 6673 opposite last page.



VOTATOR Continuous Reactor for sulfonation.

HOW *Votator*[®] CONTINUOUS REACTORS

provide rigid heat control and complete dispersion of reactants

OPERATION. VOTATOR* Continuous Reactors combine multiport injection system with scraped surface heat exchange. This permits handling of those reactions which evolve large quantities of heat, and those end products which are very viscous or result in a reaction product which fouls conventional heat exchange surfaces.

APPLICATIONS include sulfonation, sulfation, nitration, polymerization, saponification, neutralization, condensation, oxidation. Typical flow charts are shown above.

ADVANTAGES. Permits precise control of heat of reaction and improved processing of heat-sensitive materials. Conducts reactions continuously without excessive pressure drops. Immiscible reactants are maintained in finely dispersed state. Variables controlled automatically. Operation is safe, clean. Output is high. Costs are low. Saves floor space.

COMPLETE DETAILS

Bulletin V250 gives complete information — applications, operation, advantages, specifications of VOTATOR Continuous Reactors. Free on request.

* VOTATOR — Trade-Mark Reg. U. S. Pat. Off.



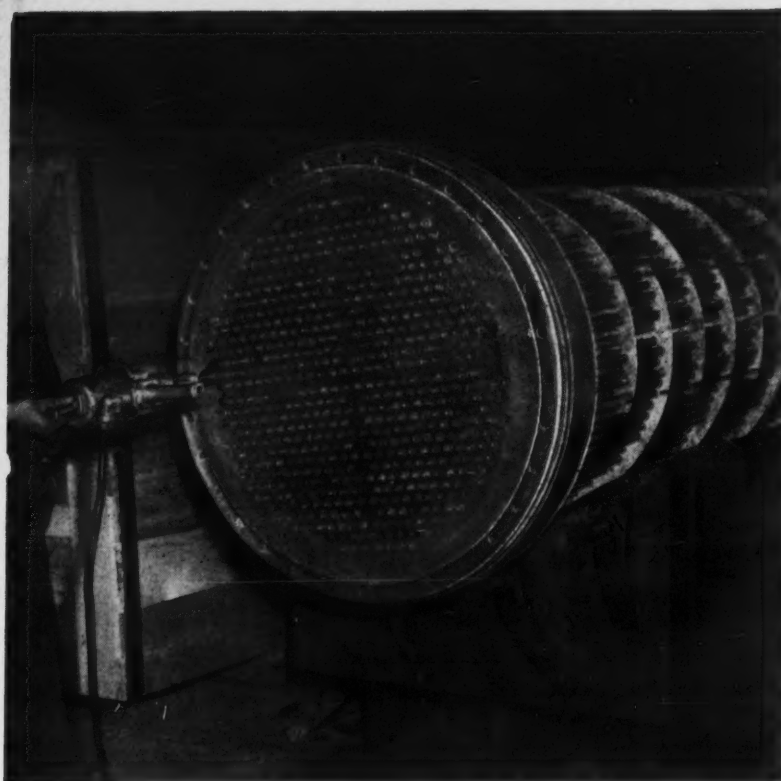
GIRDLER PROCESS EQUIPMENT DIVISION CHEMETRON CORPORATION

Louisville 1, Kentucky

Manufacturers of "VOTATOR" and "THERMEX" Processing Apparatus

VOTATOR SALES OFFICES: Louisville • New York • Chicago • Marietta (Georgia) • San Francisco

Check 6674 opposite last page



Tricky assembly job handled with ease...at Downingtown

Specs said: Roll type 329 stainless tubes into type 316 and 304 tube sheets. A tricky problem, since the 329 tubes are 15-20 points harder on the Rockwell B scale than the 304 and 316 tube sheets.

What's more, an alert suggestion saved our customer the cost of a test shell, by utilizing the annulus created by the specified double tube sheet construction.

Design Pressure: Shell — 125 psi at 300° F.
Tubes — 75 psi at 300° F.

Hydrostatic Test Pressure: 150 psi

Construction: Per ASME Code, Para. U-69...Customer Inspected

Tubes: 608 Stainless Steel Tubes, Type 329 (Carpenter #7MO)
¾" O.D. x 16 ga. x 15' 9" L
Outer Tube Limit: 30 ⅜"...4 Pass

Floating Tube Sheets: Two—1½" and 2" thick...32 ⅜" O.D.

Fixed Tube Sheets: Two—1¼" and 1¾" thick...38 ⅜" O.D.

Shell Side Tube Sheets: Stainless Steel, Type 304.

Tube Side Tube Sheets: Stainless Steel, Type 316.

Write for helpful heat exchanger design data—Bulletin HE.

Downingtown Iron Works, Inc.

144 Wallace Ave., Downingtown, Pennsylvania

division of **PRESSED STEEL TANK COMPANY** Milwaukee
Branch offices in principal cities

HEAT EXCHANGERS — STEEL AND ALLOY PLATE FABRICATION
CONTAINERS AND PRESSURE VESSELS FOR GASES, LIQUIDS AND SOLIDS



Check 6675 opposite last page

PROCESSING EQUIPMENT

Demineralization data

Dealing with one of the most important phases of water treatment, bulletin of 30 pages covers application of demineralizers, their basic principles of operation, and chemistry of ion exchange resins. Section on estimating operating costs on various types of systems and tables of useful data are included. Bul WC-111A — Graver Water Conditioning Co., Div. of Graver Tank & Mfg. Co., Inc., 216 West 14th St., New York 11, N. Y.

Check 6676 opposite last page.

Wet-type dust collector discharges air clean and dry

Except for water slinger, unit has no moving parts

Uses: Cleaning dust-laden air and gases.

Features: Unit's dust collecting efficiency is high. With exception of the water slinger, collector has no moving parts. Air that is discharged is essentially dry and dust-free.

Description: Main components of wet-type collector are: water slinger, tangential air inlet, air spiral, casing, inner wall, inner cylinder, intersecting strips, baffle, and outlet chamber.

Incoming air enters collector tangentially through air inlet. A water slinger is located in air inlet. Slinger is essentially a wide v-belt sheave with grooves running its full width. There are drainage holes in the slinger. Function of slinger is to throw water spray which pre-wets incoming dust-laden air.

Incoming air is subjected to cyclonic action before it hits water. This serves to separate out the heavy particles. Violent turbulent vortical action is created on surface of water impinged by air.

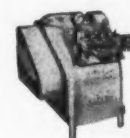
Flow of air at this point changes from spirally downward to spirally upward in a narrow space formed between inner wall of collector and inner cylinder. Wetted mixture flows upward and impinges upon an inverted "V"

HOMOGENIZING



New Tricks for old blends with Gaulin "PARTICLE CONTROL"

Get the jump on costs and quality! See what a Gaulin Homogenizer or Colloid Mill can do for you...



- **Pharmaceuticals:** more uniform, stable and finer emulsions.
- **Grease:** increases penetration value and uniformity.
- **Cosmetics:** produces smoother textures, longer shelf-life, locks-in fragrance.
- **Wax Emulsions:** less emulsifying agent required, increases stability.
- **Pigments:** produces continuous, high capacity dispersions to finest possible particle size.

Try Homogenizing your product. Send a sample or rent Laboratory Homogenizer for only \$75.00 a month. Gaulin Technical Assistance will help you bring new cost-saving solutions to processing operations.



Homogenizer Bulletin H-55
Sub-Micron Dispenser
Bulletin SMD-55



Colloid Mill Bulletin C-57
Laboratory Homogenizer
Bulletin LH-55



Manton-Gaulin Manufacturing Co., Inc.

55 Garden Street, Everett 49, Mass.

World's largest manufacturers of high pressure pumps, homogenizers and colloid mills.

Check 6677 opposite last page

CHEMICAL PROCESSING

PROCESSING EQUIPMENT

baffle. Baffle's function is to trap and deflect dust and water. Entrapped dust and water falls and settles out on bottom of collector.

Air continuing upward past baffle comes into contact with dense downward water spray. This removes most of remaining dust particles. Continuing its upward whirling travel toward outlet, air expands, and is subjected to additional centrifugal action, which results in essentially dry and dust-free air being discharged.

Standard units are equipped with sludge ejector for automatic, continuous removal of accumulated sludge. Make-up water enters scrubber through $\frac{1}{2}$ " pipe. Water consumption depends upon evaporation and amount of water being removed with sludge. As a rule, a 6000 cfm unit will use about $3\frac{1}{2}$ gal water per minute.

Scrubbers are available in 12 sizes, ranging in capacity from about 1100 to 33,000 cfm. All are designed to operate between 3 to 6" static pressure.

(Further information about the Wheelabrator Wet Collector can be obtained from Wheelabrator Corporation, 1036 S. Byrkit St., Mishawaka, Indiana.)

Check 6678 opposite last page.

Fluid energy grinding

Bulletin of four pages describes fluid energy grinding and gives typical grinding data for various materials. Cross-section drawing of grinding unit is shown. Bul 091 — Sturtevant Mill Company, Harrison Sq., Boston 22, Massachusetts.

Check 6679 opposite last page.

Pneumatic roller mills

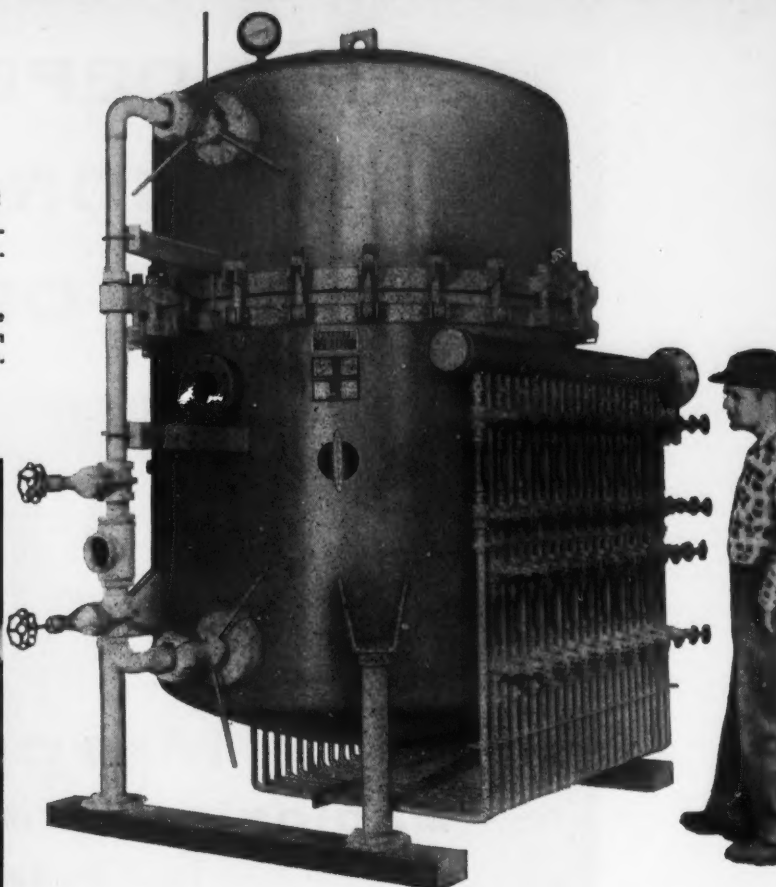
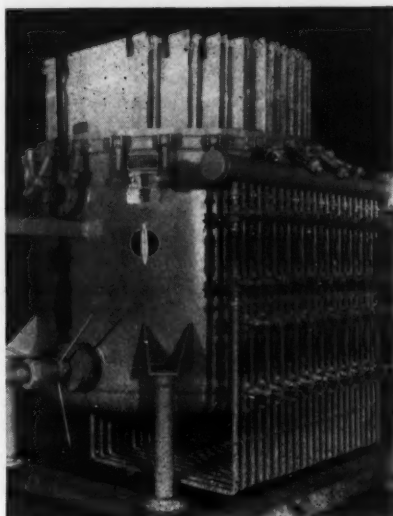
Illustrated catalog of 30 pages contains drawings, specifications, capacities, and construction and maintenance facts on manufacturer's screen-type and pneumatic mills. Cat 63 — Bradley Pulverizer Company, Dept. 38, Allentown, Pa.

Check 6680 opposite last page.

SPARKLER MODEL VF FILTER

All Monel metal filter elements designed for filtering caustic solution. 850 sq. ft. of filtering surface.

Custom engineered for performance in areas with restricted headroom and other plant space limitations.



Another SPARKLER VERTICAL PLATE FILTER

Designed for service in one of America's largest chemical plants

Individual plate outlet control valves, sight glasses and sample cocks. Any plate may be cut out of service without interrupting filtering cycle.

This filter is particularly suited for toxic and volatile products. Sealed tank is maintained throughout cleaning and filtering cycles. Available in capacities from 100 sq. ft. to 1000 sq. ft.

Exclusive new vertical plate design. Rigid and non-collapsible plates, with unrestricted high flow center construction.

Spent cake is easily removed without opening filter with the exclusive Sparkler spray sluicing system.

You can depend on Sparkler for the latest developments in modern filtration engineering.



SPARKLER MANUFACTURING CO.
MUNDELEIN, ILLINOIS U. S. A.

Sparkler International Ltd., Manufacturing Plants at Leliegracht 9,
Amsterdam, Holland; Toronto, Ontario, Canada; Italy and Australia.

FILTRATION ENGINEERING AND MANUFACTURING EXCLUSIVELY FOR OVER 30 YEARS.

Check 6681 opposite last page

SAFE! DEPENDABLE!
MORE LIGHT!
LOWER OPERATING COST!

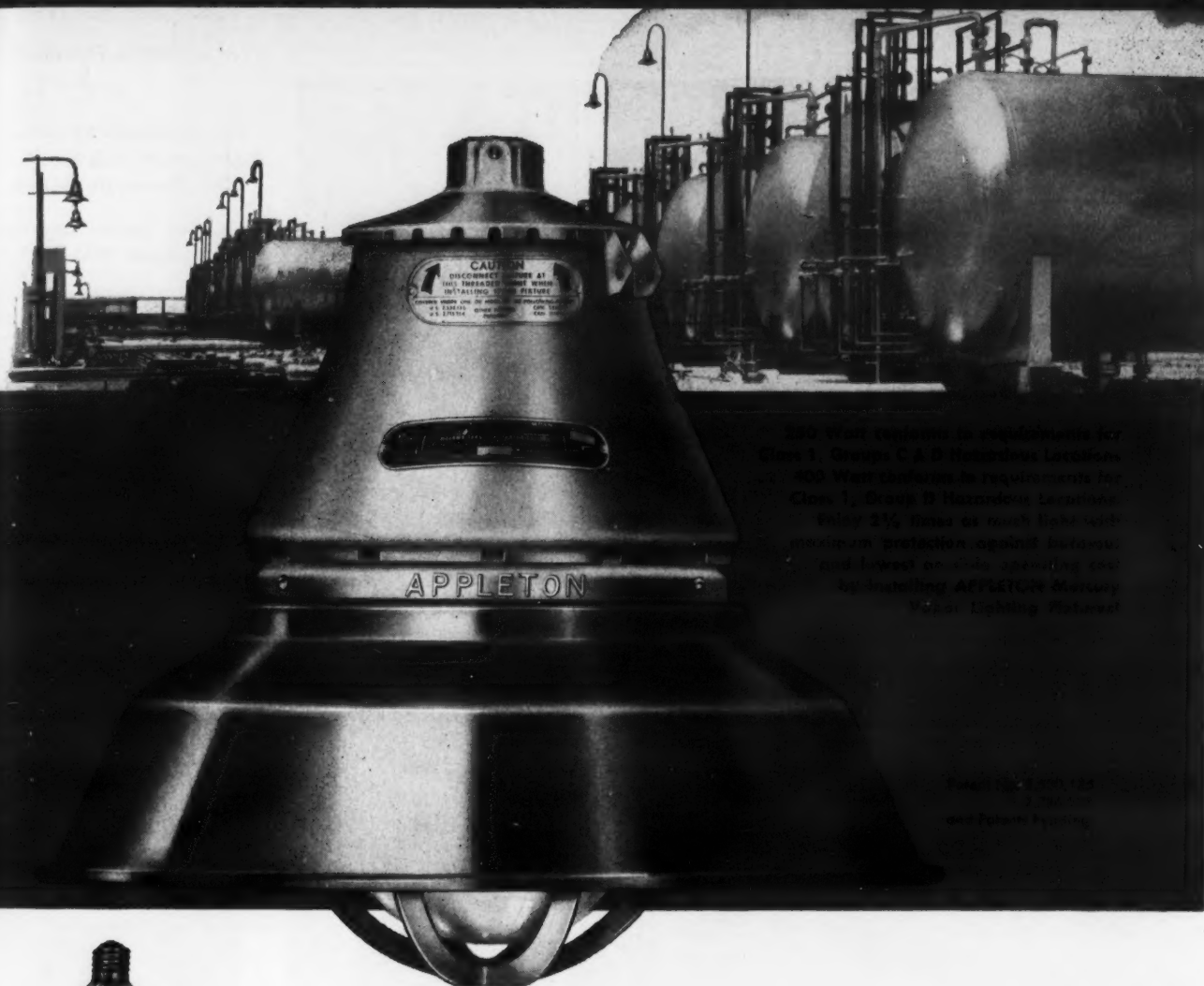
APPLETON®

**Mercury Vapor
 Explosion-Proof Lighting Fixtures
 for Hazardous Areas**



All these exclusive features available only with APPLETON "AA-51" Series Vented Fixtures

- Standardized Unilet Body permits a variation for mounting of fixture
- Gasket forms a positive seal between unilet body and dome unit assembly
- Connecting Block houses recessed contact springs through which line wires are connected with screw terminals
- Collector Ring and Center Stud are energized after five full threads have been encased
- Shock Absorbing "Lamp-Lock" Socket prolongs lamp life with its resistance to shock
- Porous Metal Cylinder serves as a flame arrester and permits breathing of fixture
- "Full-Circle" Venting acts as a louver to aid in an even distribution of heat
- Heat and Impact Resisting Globe detaches itself from fixture when globe ring is unscrewed
- Cast Aluminum Guard has six sturdy braces for fixture protection
- Mercury Vapor Fixtures available for 250 and 400 watt lamp sizes



500 Watt required in requirements for Class I, Groups C & D Hazardous Locations
 400 Watt maximum in requirements for Class I, Group D Hazardous Locations
 Value 2 1/2 times as much light with maximum protection against failure, and lowest possible operating cost by installing APPLETON Mercury Vapor Lighting Fixture

Patent No. 2,375,125
 2-28-50
 Appleton Electric Company



Mercury Vapor Lamps:
 250 watt—C-H5 Clear
 —D-H5 Color Corrected
 400 watt—E-H1 Clear
 —J-H1 Color Corrected
 —S-H1 Silver White

■ Where millions of dollars in capital investments are involved in oil refineries, chemical plants, coal mines, grain elevators, paint factories and other types of businesses with hazardous areas, explosion-proof lighting providing more light at less cost is worthy of the most serious consideration. In these "AA-51" Series Vented Fixtures you get all the benefits of proven APPLETON design and sturdy, vibration-proof construction resulting from years of pioneering effort. Investigate APPLETON . . . the complete, interchangeable line that offers the maximum in protection, and a full complement of accessories including mountings, reflectors, and allied equipment. Write for full details.

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APPLETON ELECTRIC COMPANY

1701 Wellington Avenue

Chicago 13, Illinois

Additional Types of "AA-51" Series Explosion-Proof Lighting Fixtures



Ceiling Mounting



Pendent Mounting



Long Bracket Mounting



Short Bracket Mounting

For more information on product at left, specify 6682 see information request blank opposite last page.



**With an
eye
on
antibiotics
and
oil
wells
Pfizer
filters
with
fabric**

30" stainless steel plate and frame filter press
used in an intermediate step in the purification of antibiotics.



A filter cloth being fabricated at Pfizer's Brooklyn "tailor shop." Wellington Sears filter fabrics are used on stainless steel plate-and-frame presses, as shown in large picture, and also on rotary filters.

Through a fabric in a filter pass antibiotics, pharmaceuticals and chemicals which may one day help save a life. Or fight the afflictions of old age. Or control a plant disease. Or—in the case of citric acid—help recover oil from "tired" wells. In the hands of specialists at Chas. Pfizer & Co., Inc., that fabric becomes an active tool in the highly successful mass production of their laboratory finds.

That a leading producer of antibiotics and other chemical products should assign the filter job to Wellington Sears fabrics is still another sign of how importantly fabric figures in industry's plans. And it is logical that organizations with first-hand understanding of research and experience should turn to Wellington Sears, to make use of more than a century of experience in serving the textile needs of industry. If you have a problem related to fabrics, in filtration, rubberizing, coating, laminating, or any combination of textiles with other materials, we'll be glad to help. And for a useful booklet, write Dept. M-8, for "Fabrics Plus," or "Filter Fabric Facts."

Wellington Sears *FIRST In Fabrics For Industry*



Wellington Sears Co., 111 W. 40th St., New York 18, N. Y. • Atlanta • Boston • Chicago • Dallas • Detroit • Los Angeles • Philadelphia • San Francisco • St. Louis

Check 6683 opposite last page

PROCESSING EQUIPMENT

**Dry materials classified
at rates up to 3 ton/hr
with pneumatic system**

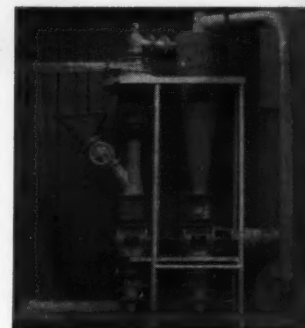
Closed system also permits
processing toxic items

Uses: Separating and classifying wide range of dry materials.

Features: Pneumatic system permits sharply divided separations to be carried out at rates up to three tons per hour. Fractions of any required fineness can be obtained without breaking process continuity.

Classifying in the closed-circuit system when using an inert gas instead of air permits handling of toxic or explosive materials.

Description: Pneumatic classifying systems are available in two basic designs: 1) fine air sifters with centrifugal separation, and 2) coarse air sifters with gravity separation. Fine system has classifying limits of from 10 to 500



Sifting ranges of from 10 to 500 microns are possible with this system. Coarse fractions are removed by air sifter (top left), fines are deposited in cyclone (top right)

microns. Coarse system sifts particles 500 microns and up. Particles smaller than sifting limit are collected by supplementary cyclones.

In operation, material to be classified is fed into system through a feeder and conveyed by air stream into the air sifter. Coarse fractions of predetermined size are deposited here. They are discharged by an air seal.

Fine fractions pass on into

To page 158



Moved Recently?

If you have, you will want to make sure that your copy of **CHEMICAL PROCESSING** will continue to come to you on time.

Maybe...

you have received a promotion and have been transferred to a new location.

Or, if you have changed your affiliation, we want to make sure that your copies of **CHEMICAL PROCESSING** will follow you.

Fill out...

the slip opposite the back cover. Be sure to answer all questions regarding your new location, title, and company.

In addition, give us your former address, including company, city, state.

Mail this slip to the Reader-Service Department and we will make sure you will continue to receive each issue of the magazine promptly.

For more information on product at right, specify 6684 see information request blank opposite last page.



Cost-cutting approach saves \$6,000 on fluid mixing

An idea from your LIGHTNIN Mixer representative's briefcase

Here's a fluid mixing idea that has already saved a company \$6000 on equipment, and is saving many more dollars on operating expense.

In this plant, heavy clay-and-water slurry is mixed in tall tanks. But this operation posed a big maintenance problem, because the long vertical mixer shaft in each tank had to be steadied by a bearing in the tank's bottom. Gritty clay kept getting into this bearing and grinding it to pieces in a few weeks.

Then production had to stop while maintenance men hoisted out the heavy shaft and installed a new bearing. The bearings didn't cost much, but the tab for replacing them was ruinous.

Finally a LIGHTNIN Mixer representative explained how this company could easily mix uniform clay

suspensions in its tall tanks—with a side entering LIGHTNIN Mixer like the one you see here.

Now there's no maintenance headache, because no steady bearing is needed; so production keeps moving without costly stoppages.

Also, it costs \$6000 less to install one of these LIGHTNINs than it would cost to replace the older mixers, mainly because no elaborate bracing is required on top of the tank. And this company reports its clay suspensions are much more uniform than before.

What this man can do for you

This is just a sample of the cost-cutting approach to mixing that you get from your LIGHTNIN representative.

He can bring you long-term savings

on fluid mixing better than anyone else—because that's his job, and he's an expert at it.

He can help you avoid engineering headaches, too, because his recommendations are based on unique MIXCO pilot-run data guaranteed accurate.

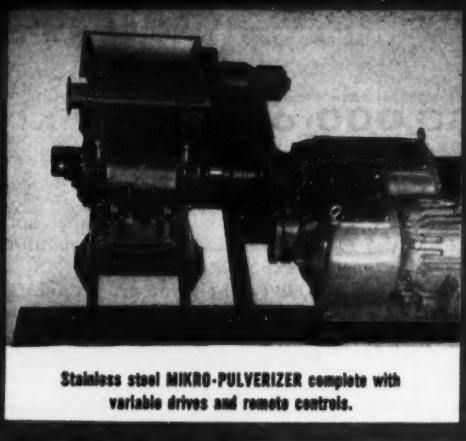
Take advantage of his unmatched experience by calling on him for prompt help on any fluid mixing operation. You'll find his name in Chemical Engineering Catalog. Or write us direct.

**Lightnin®
Mixers**

MIXCO fluid mixing specialists

MIXING EQUIPMENT CO., Inc., 185-h Mt. Read Blvd., Rochester 11, N.Y.
In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Avenue, Toronto 10, Ont.

**Powdered
to power
the rockets.....**



Stainless steel MIKRO-PULVERIZER complete with variable drives and remote controls.

MIKRO-PULVERIZERS are helping to improve and increase the output of rocket fuel materials ground to rigid "space age" specifications . . . easily and safely handling hygroscopic and highly explosive materials such as ammonium and potassium perchlorate. As a result, a uniform finished product can be produced.

A MIKRO-PULVERIZER, operating in a controlled atmosphere, can be incorporated in a completely closed and contamination-free system, with 99.9% *plus* product recovery in a MIKRO-PULSAIRE Collector.

Regardless of what your grinding problem is, we can help you "get it off the ground". The MIKRO-D laboratory will gladly test the material you grind or collect and submit recommendations without obligation. Send today for confidential data sheets. *And ask for Bulletin 51A.*

Mikro-D

**PULVERIZING MACHINERY DIVISION
METALS DISINTEGRATING COMPANY, INC.
60 Chatham Rd., Summit, New Jersey**

GENUINE MIKRO-D REPLACEMENT PARTS AVAILABLE FROM LARGE STOCK WITHIN 48 HOURS

MANUFACTURERS OF PULVERIZING, AIR CONVEYING AND DUST COLLECTION EQUIPMENT

Check 6685 opposite last page

PROCESSING EQUIPMENT

From page 156

a cyclone where most of fines are deposited and discharged. Conveying air moves out of cyclone to a fan where it is recirculated back into system.

Separation is mainly dependent on the resistance offered by the individual particles to the air stream. By varying rate of air flow, particles below any predetermined size can be separated. Additional adjustment is possible by altering position of cone in air sifter.

(Pneumatic classifying systems are product of Fluor-Hartmann Division, Fluor Products Company, A Division of The Fluor Corporation, Ltd., Whittier, California.)

Check 6686 opposite last page.

Plate heat exchangers

Eight-page bulletin describes benefits of plate heat exchangers, and lists applications, dimensions, specifications, and features. Plate heat exchanger bul — The De Laval Separator Co., Poughkeepsie, N. Y.

Check 6687 opposite last page.

Supply source for wire cloth

Imported woven wire cloth for exacting requirements in the process industry is being offered by Midwest firm. Cloth is available in various sizes up to 500 mesh, openings to 2 microns. Product can be obtained in all metals, alloys, and weaves, and cut to specification.

(Industrial wire cloth is available from J. R. Mills & Co., 1900 Winnetka Ave., Northfield, Ill.)

Check 6688 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



**PLANT ENGINEERING
MAINTENANCE & SAFETY**
electrical & mechanical developments



Engineer checks temperature at concentrator on air conditioning equipment that maintains proper temperature and humidity in capsule-sorting area at Eli Lilly and Company

Air conditioning system assures continuous production of high-quality capsules

Dependable installation furnishes clean, dust-free, odor-free air of required low humidity — uses non-corrosive dehumidifying agent

GORDON WEYERMULLER, Associate Editor
With HUGH F. JOHNSON, Project Engineer
Eli Lilly & Company, Indianapolis, Indiana

Problem: Equipment that had been used at Eli Lilly for air conditioning capsule-sorting area was inadequate for handling the increased load resulting with high production rate. This equipment originally consisted of a spray-type air washer which had been supplemented with liquid absorbent equipment. Inadequate control, excessive maintenance, and the need for additional capacity made

the existing system ineffective.

Lower relative humidities than could be obtained using chilled water were needed for manufacturing and product improvement. Loads and required conditions, along with economic considerations, indicated that the sorting area should have an air conditioning system independent of the manufacturing area.

A lower relative humidity in the sorting room than in the capsule manufacturing area would facilitate further drying of the empty capsules. Gelatin capsules are hygroscopic. If exposed or stored in a dry area after manufacture,

Reduce Equipment Downtime And Replacement Costs

... with
CLEVELAND
Custom
Produced
Welded
Hard-Faced
Components



• Resistant to Wear, Corrosion and High Temperature

• In All Stainless Steel And Ferrous Alloys

■ Welded super alloy overlays applied only to critical areas subject to corrosion, erosion, abrasion, heat, thermal shock or impact, provide superior surface properties and precision finishes.

Whatever the size or shape, the metal overlay can be fused to all stainless and ferrous alloy O.E.M. and worn equipment at low cost.

For practical, prompt assistance on your application, send in your blueprint or call on our trained specialists.

Write for detailed literature

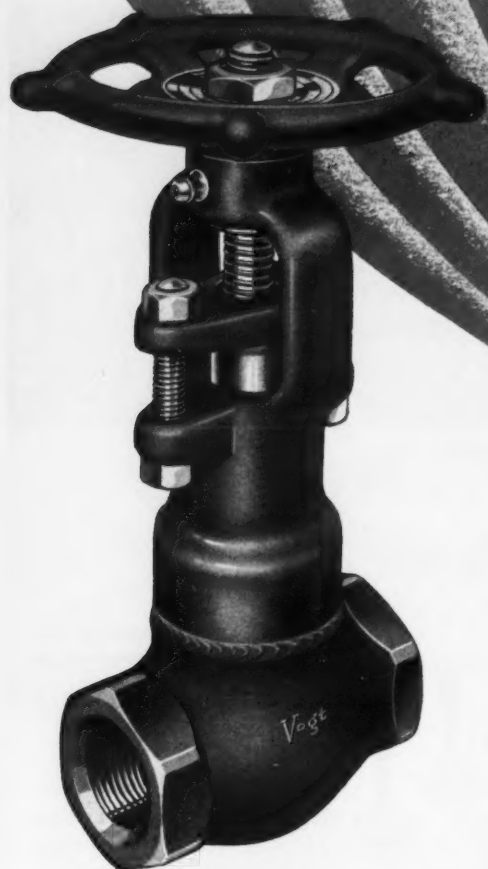


Cleveland Hard Facing, Inc.

3047 STILLSON AVE. • CLEVELAND 5, OHIO

Check 6689 opposite last page

Another addition to the Vogt line of TOP QUALITY valves . . .



Series 2801 Gate Valve
Illustrated

Series 2821 Globe Valve
Also Available

Both series identical in dimensions and have 13% chrome stainless steel trim.

Forged Steel WELDED BONNET



Gate and Globe VALVES

150-800 Pounds Service

To eliminate forever potential body-bonnet leaks, Vogt engineers have developed these new General Purpose valves with seal welded bonnet joints.

This new addition to the world's most complete line of forged steel valves incorporates all the features of other Vogt GP valves—hard faced seats, hardened stainless steel wedges, drop forged pressure parts, and the numerous other advantages of Vogt's valve line.

The desirable safety feature of a back seat on the stem is retained while still offering the elimination of a possible body-bonnet leak.

Available NOW in both gate and globe types, 1/4" thru 2", and in both socket weld and screw ends. These are priced identical to the bolted bonnet GP valves; gate valves the same as Series 12111 and globe valves the same as Series 12141.

Address Dept. 24A-FCP
for literature

they will lose some additional moisture. This is desirable in that it prevents fusing of cap to body on individual capsules or the fusing of capsule to capsule. Hence, empty capsules could be more easily disassembled, filled, and reassembled.

Air conditioning system selected had to be capable of being operated continuously with a high degree of dependability. Equipment should operate over long periods with a minimum of maintenance and downtime.

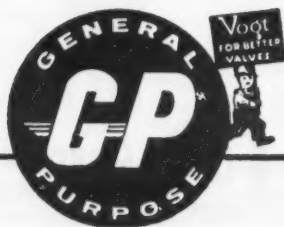
Solution: Based on an engineering survey in March 1957, a new air conditioning system was installed for capsule-sorting room. It employs an absorbent liquid as a dehumidifying agent. This liquid is hygroscopic and non-corrosive.

With air conditioning system installed, dry bulb and dew point of air are controlled independently by spraying the hygroscopic liquid into a spray chamber. After moisture is removed from air by dehumidifying agent, the latter is circulated to a "concentrator" for removal of moisture. Cycle is controlled by continuously sampling the boiling temperature of the liquid being sprayed in the conditioning unit. This measures the amount of moisture in the liquid and its capacity to absorb more moisture. A cooling coil located in the spray chamber maintains a spray temperature necessary to obtain desired dry bulb temperature, as well as desired dew point.

System design is based on capacity to maintain room at 75°F dry bulb and 20% relative humidity. Unit handles 16,000 cfm of air, 14,500 being recirculated air from conditioned space and 1500 cfm being fresh air at 95°F dry bulb and 130-grain moisture content. During the operation, about 190 lb of moisture per hr is removed from the air.

Results: Air conditioning system has run continuously since it was installed nearly a year ago, with only a minimum of maintenance. High-quality capsules are being produced, both for filling at

Vogt



HENRY VOGT MACHINE COMPANY, Louisville, Ky.

SALES OFFICES: New York, Chicago, Cleveland, Dallas, Camden, N. J., St. Louis, Charleston, W. Va., Cincinnati.

FORGED STEEL

VALVES

Check 6690 opposite last page

Eli Lilly and for shipment to empty-capsule customers.

In addition to alleviating fusing problems, the low humidity has improved handling problems involved in shipping and filling operations. Passage of the air through the absorbent spray washes it free from dust and dirt and makes it odor-free.

(Air conditioning system is product of Niagara Blower Company, 405 Lexington Ave., New York 17, New York.)

Check 6691 opposite last page.

All-weather roof coating is easily applied to wet or dry roof

Not affected by temperature extremes; fire retardant

Uses: As all-weather roof coating for patching or covering entire surface.

Features: Easily applied to a wet or dry roof in extreme heat or cold, coating is also fire retardant.

Description: Roof coating is a black, suspended, homogeneous plastic coating which gives good adhesion and sub-



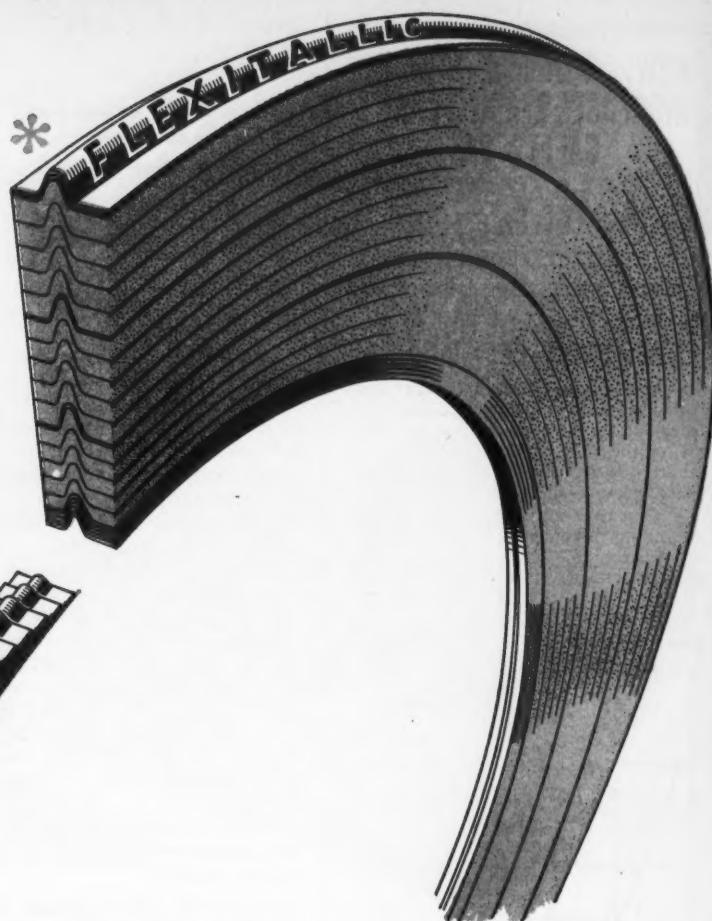
Ready-to-use, permanent roof coating can be applied to wet or dry surface in extreme heat or cold

stantial water proofing. Roofing slag is not needed, eliminating a frequent cause of drain clogging.

Coating comes ready for application, and can be applied by brush or spray without heating or thinning.

("Snowbird" roof coating is product of Maintenance Engineering Co., 16 West Johnson St., Philadelphia 44, Pa.)

Check 6692 opposite last page.



PUT FLEXITALLIC IN THE "PRINTS"
For Sealing Performance You Can Depend On

For nearly fifty years, there has been one uniquely resilient seal with a spring-action that adjusts to every change in operating conditions. It's the Flexitallic Spiral-Wound Gasket ... identified for engineers by the blue dye in the Canadian asbestos filler.

In Flexitallic Spiral-Wound Gaskets, compression response is directly related to bolting for each application. With the desired gasket design determined, exacting mechanical controls assure that manufactured gaskets conform to specification.

Flexitallic Spiral-Wound Gaskets serve under the most rigorous operating conditions — from vacuum to

6,000 lbs., from extreme sub-zero to 2000°F. The amazing flexibility of the Flexitallic Gasket makes flanged joints leak-proof even after severe thermal shock, vibration, chemical attack, and cyclic operation.

That's why: for sealing performance you can depend on, it pays to put "Flexitallic" in the blueprints.

FLEXITALLIC GASKET CO.
8th & Bailey Sts. Camden 2, N.J.

Flexitallic
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Flexitallic is a registered trademark. No one else can make a Flexitallic Gasket. Look for Flexitallic Blue — it's our exclusive blue-dyed Canadian asbestos filler.

Check 6693 opposite last page

**NEW...PYRAMID DESIGN
INCREASES STABILITY AND
SAFETY OF
BALLYMORE
ALUMINUM Safety-Step
LADDERS**

**SANITARY • EASY TO CLEAN
LIGHTWEIGHT • EASY-ROLLING**

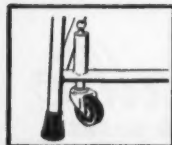
Utilizing a pyramid design, new Ballymore Aluminum Ladders are larger at the bottom than at the top, giving the user greater safety and a secure feeling that tends to increase speed, accuracy and efficiency of work.

Construction is tough, all-welded aluminum tubing, reinforced for maximum strength. There are no rivets, bolts or screws to loosen or lose.



12 MODELS TO CHOOSE FROM, including a convenient, light, 3-step folding ladder. 1-, 2- and 3-step models are available with or without casters. Safety handrails are optional on 2-, 3- and 4-step models, are standard on 5-step ladders. Steps are made of solid, slip-proof ribbed aluminum tread.

Fingertip mobility is provided by large, spring-mounted, smooth-rolling casters which retract under the user's weight. In use, wide-base rubber-tipped legs grip the floor so that ladders are stable and secure.



Write for illustrated folder containing complete information. Ballymore Company, West Chester 10, Pa.

**BALLYMORE
EQUIPMENT
FOR ABOVE FLOOR
WORKING SAFETY**



DISTRIBUTORS IN PRINCIPAL CITIES

Check 6694 opposite last page

ENGINEERING & SAFETY

**Greater foam expansion
resistance to water
mark fire-killer**

Use protein stabilizer charge

Uses: For fire extinguishment where hazards involve dip tanks, drain boards, and quenching tanks.

Features: Chemical foam actively resists water discharge from overhead sprinkler system. Therefore, need for a water deflection canopy is eliminated. Protein-based stabilizer incorporated in recharge provides 35 to 40% greater foam expansion.

Description: Aluminum sulfate dissolved in water is stored in an inner chamber. Solution of sodium bicarbonate to which has been added a protein base stabilizer, or foaming agent, is contained in an outer chamber. Upon actuation of the unit, the two solutions are combined resulting in production of a large quantity of carbon dioxide gas and aluminum hydroxide, plus sodium sulfate.

(Foamite ST unit is product of American LaFrance Corporation, 130 East LaFrance St., Elmira, N. Y.)

Check 6695 opposite last page.

**Develop simple device
for reliable detection
of X-, gamma rays**

Uses: For checking exposure to X-rays and gamma rays.

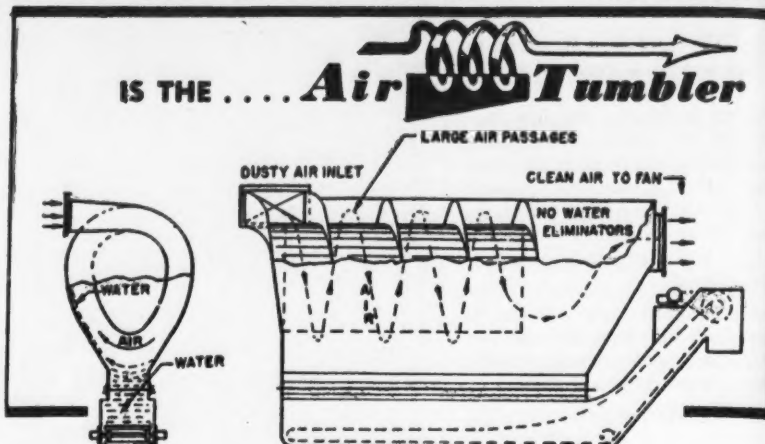
Features: No external charging equipment is required; user may recharge dosimeter by simply shaking it.

Description: Detector is slightly larger in diameter than the average fountain pen and weighs one ounce. To read the detector, you simply look through the eyepiece and toward a light source.

The principle of operation is that of discharging two similarly charged spheres by the ionization of air surrounding them. The ionization occurs by the passage of X- or gamma rays through the air con-

To page 164

The MASTER of DUST in INDUSTRY



**SIMPLE — DEPENDABLE — NO FIRE HAZARD
HIGH EFFICIENCY — CONSTANT CAPACITY
LOW OPERATING COST**

More than one million CFM in ONE plant

Write for Bulletin No. 581. Address:

DUST SUPPRESSION & ENGINEERING COMPANY

P. O. BOX 67, LAKE ORION, MICHIGAN

Agents in all principal U. S. cities

Check 6696 opposite last page

My eyes! My face!



Model 8933:

Face spray ring acts simultaneously with eye-wash, sending controlled streams of water from specially designed twin fountain heads.

**Provide instant
relief with ... HAWS
EMERGENCY EYE and
FACE WASH FOUNTAINS**

Eye and face hazards are inevitable in industry... so take positive steps to reduce the extent of injury and minimize insurance claims. HAWS Emergency Eye and Face Wash Fountains flood contaminated areas with water — instantly ridding face and eyes of caustics, chemicals and dangerous particles. This instant relief may well prevent permanent damage — bridging the gap until medical aid arrives. Install extra safety — HAWS Emergency Fountains and Drench Showers.

Write today for detailed information on the complete HAWS line of emergency facilities. HAWS DRINKING FAUCET COMPANY, 1443 Fourth Street, Berkeley 10, Calif.



Check 6697 opposite last page

CHEMICAL PROCESSING

Y
THAT'S
INTERESTING

No-tear sack

Sacks, not the two-legged kind, can now be made tearproof using new stretchable paper invented by Sanford Cluett of

Sanforizing process fame. Paper is made of pulp treated by standard chemical methods, then put on rubber drying belt. Process which bunches fibers provides stretch. In drop tests, new paper outlasts conventional kind about 10 to 1 without tearing. (*Industrial Newsletter*, Armour Research Foundation)

Magnetic forces

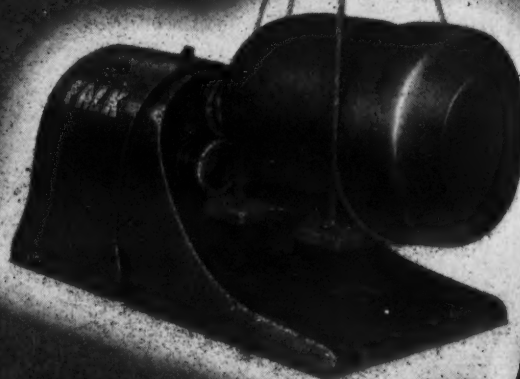
Two scientists from the Dept. of Commerce have perfected method of measuring the magnetic forces that originate inside the earth and in outer space. It is predicted that this development will provide scientists with magnetometers far more precise and compact.

For more information on product at right, specify 6698 see information request blank opposite last page.



Change motors in minutes—

with FALK all-steel
MOTOREDUCTORS



OUT COMES OLD MOTOR



IN GOES REPLACEMENT MOTOR

No long and costly "down time" involved

Motors can be interchanged or replaced *in minutes* with the all-steel, All-Motor type FALK Motoreducer. No long and costly "down time" is involved in making the change!

Best of all, replacement is not limited to original make of motor—new NEMA frames may be substituted for old. This versatile Motoreducer operates with any make, speed or type of standard foot-mounted motor within its AGMA rating. No modification, no special shaft, no "partial" motor required.

In addition to unmatched motor interchangeability, this dependable gear drive—the "work horse of industry"—offers: widest choice of output-shaft position (horizontal, vertical, right-angle)...any output-shaft connection...any mounting, including wall and ceiling...standard speed range from 1.5 rpm to 1430 rpm. All these advantages, plus proved efficiency, low maintenance and extra-long life, make the All-Motor type FALK Motoreducer your best buy for any job requirement.

Furnished in sizes up to 75 hp with any make, style or type of motor; or, without a motor if desired. FALK Motoreducers are available from convenient factory, field or distributor stocks, from coast to coast.

Write for Bulletin 3100

THE FALK CORPORATION, MILWAUKEE, WISCONSIN

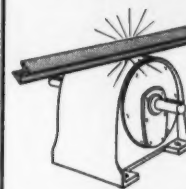
MANUFACTURERS OF:

- Motoreducers
- Speed Reducers
- Flexible Couplings
- Shaft Mounted Drives
- High Speed Drives
- Special Gear Drives
- Single Helical Gears
- Herringbone Gears
- Marine Drives
- Steel Castings
- Weldments
- Contract Machining

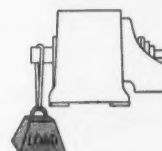
FALK

...a good name in industry

FALK "IN-BUILT" FACTORS assure full dependability— better service—longer life

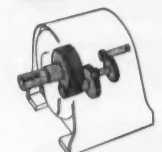


ALL-STEEL HOUSINGS
Rugged, strong, rigid...all parts heavy steel plate, formed and welded in the Falk Weld Shop.



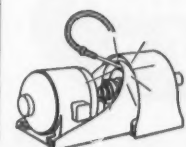
LARGE OVERHUNG LOAD CAPACITY

Large shafts, oversize bearings...rigid mountings with wide bearing spans to handle maximum loads.



PRECISION GEARING

Heat-treated alloy steel gearing, precision cut and shaved after heat treatment to eliminate distortion.



SEALED HOUSINGS

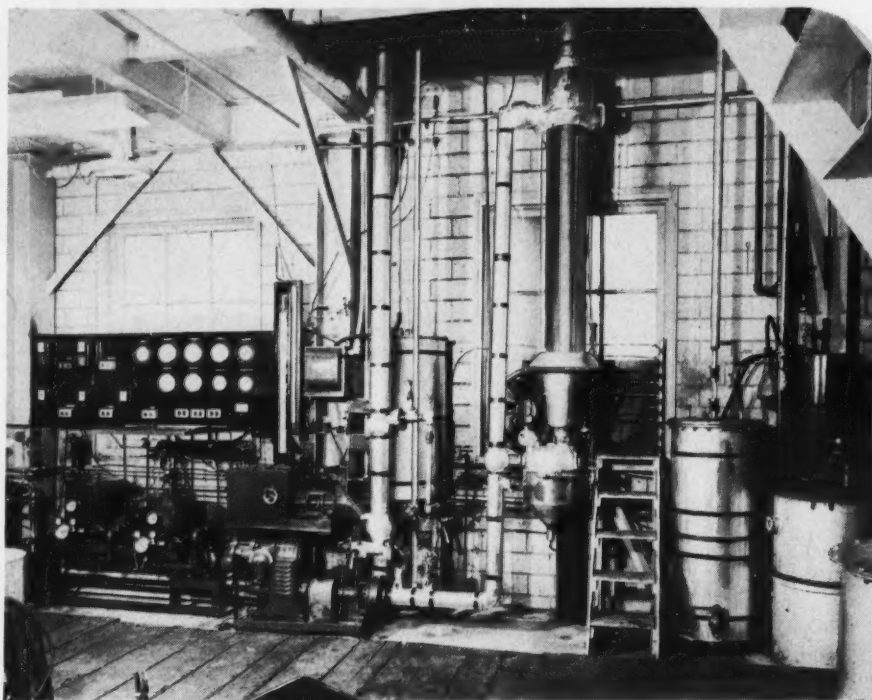
Splashproof, dustproof, oiltight. Dual closures and one-way vents keep oil in, dust and moisture out.

Solve Industrial Crystallization Problems

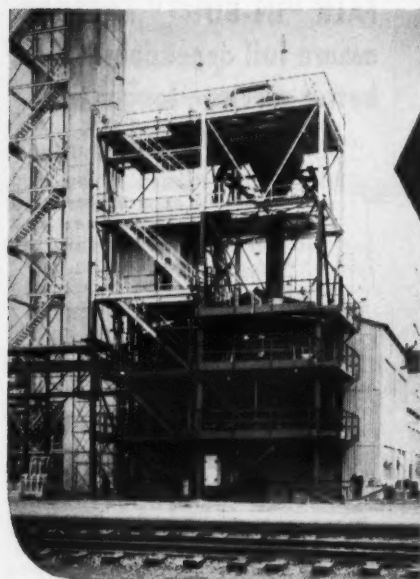
THE STRUTHERS WELLS WAY!

TYPICAL CRYSTALLINE PRODUCTS

Adipic Acid
Ammonium Sulfate
Borax
Citric Acid
Copper Sulfate
Fumaric Acid
Monosodium Glutamate
Nickel Sulfate
Oxalic Acid
Pentaerythritol
Potassium Carbonate
Potassium Chloride
Silver Nitrate
Sodium Sulfate, anhydrous
Sodium Sulfate Decahydrate
(Glauber Salt)
Sodium Sesquicarbonate
Sodium Tungstate



©Krystal Registered U.S. Patent Office



FIRST THIS:

Submit your product and operational specifications to Struthers Wells for complete experimental continuous or batch run in this pilot Crystallization Laboratory at the Struthers Wells plant.

THEN THIS:

Once crystal size, product uniformity, peak operational efficiency and lowest operating costs have been proved, let Struthers Wells recommend and build the exact Crystallizer installation to do your job best—proved with results assured! Write now for Bulletin CE-57.

KRYSTAL® CRYSTALLIZERS

by

STRUTHERS WELLS CORPORATION

WARREN, PA.

Plants at Warren, Pa. and Titusville, Pa.

Representatives in Principal Cities

PROCESSING EQUIPMENT DIVISION

Crystallizers . . . Direct Fired Heaters . . .
Evaporators . . . Heat Exchangers . . . Mix-
ing and Blending Units . . . Quick Opening
Doors . . . Special Carbon and Alloy
Processing Vessels . . . Synthesis Converters

BOILER DIVISION

BOILERS for Power and
Heat . . . High and Low
Pressure . . . Water
Tube . . . Fire Tube . . .
Package Units

FORGE DIVISION

Crankshafts . . . Pres-
sure Vessels . . . Hy-
draulic Cylinders . . .
Shafting . . . Straight-
ening & Back-up Rolls

**Struthers
Wells**

Check 6699 opposite last page

ENGINEERING & SAFETY

From page 162

tained in the hermetically sealed ionization chamber of the instrument. Readings are made by counting the divisions between two free spheres, when the instrument is held in a horizontal position.

(Dosimeter is product of Pacific Transducer Corp., 11836 West Pico Blvd., Los Angeles 64, California.)

Check 6700 opposite last page.



**Work capacity 25%
greater . . .**

. . . is reported by manufacturer of this tractor-shovel which is being introduced with a range of bucket capacities from 10 to 27 cu ft. The unit, powered by a 66 hp engine, will also be made available with a variety of attachments for specialized handling requirements.

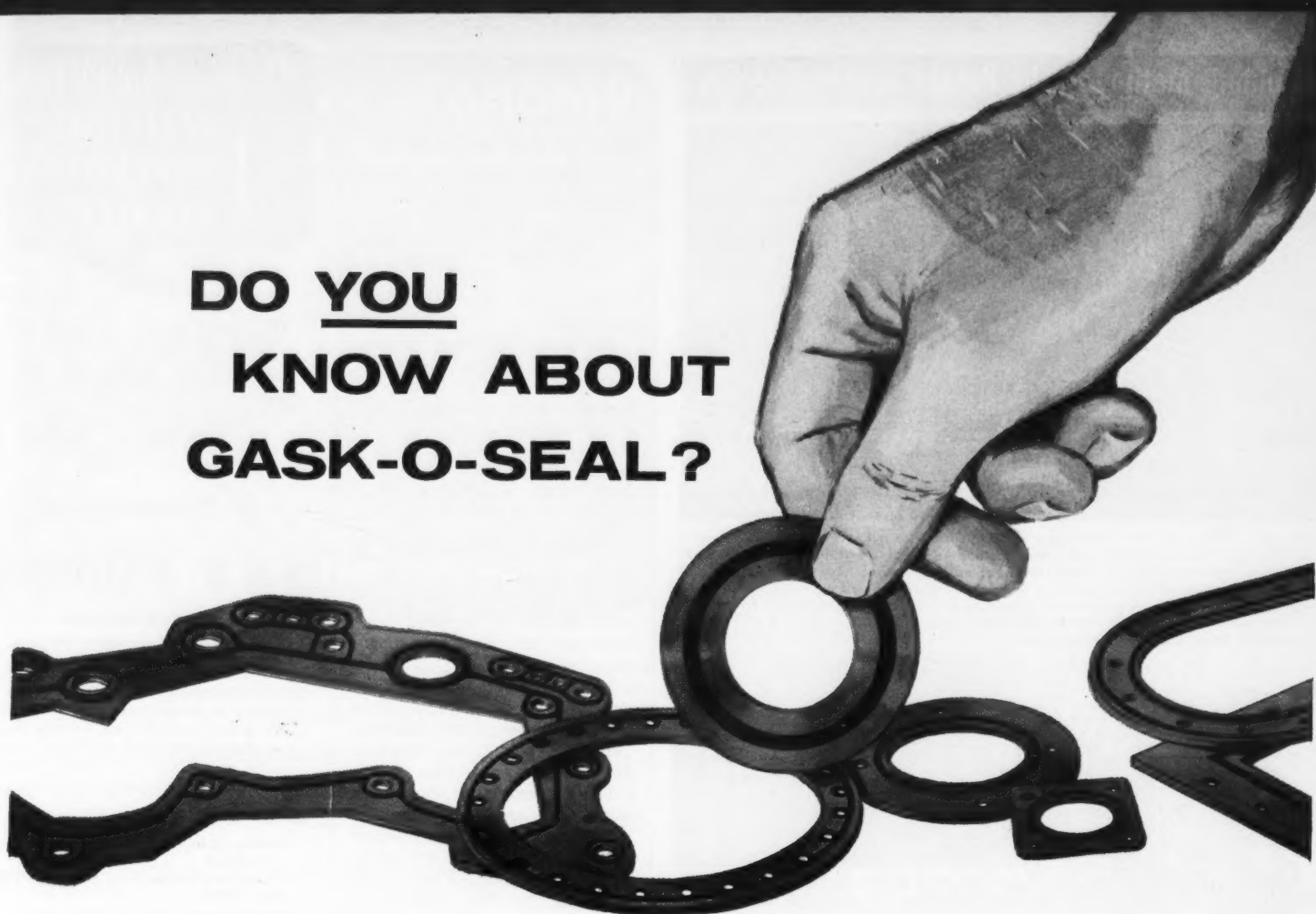
Some of the factors said to contribute to the greater work capacity are: 2500-lb carry capacity, full 6 ft-high dumping clearance, 0 to 8 miles per hour acceleration in 3½ seconds, and 45° bucket tip-back at ground level. Y-18 tractor shovel is product of The Yale & Towne Manufacturing Company, 11000 Roosevelt Blvd., Philadelphia 15, Pa.

Check 6701 opposite last page.

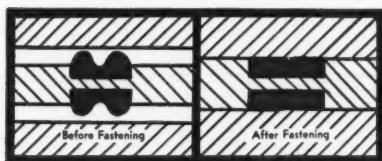
NEXT MONTH

Does the automated plant bring about an easing in the basic philosophy of safety practices? "No," says Tidewater Oil Co. as safety engineer, J. Victor McCool, describes safety program at the Delaware Refinery.

DO YOU KNOW ABOUT GASK-O-SEAL?



The static seal that can not blow out!



The above diagram is "typical" only. Gask-O-Seals are also made with one-side seals.

If you do not know about Gask-O-Seals look at these facts:

- ✓ Gask-O-Seals will seal practically any processable fluid . . .
- ✓ Gask-O-Seals can be re-used . . .
- ✓ Gask-O-Seals will seal at low or high pressures, vacuum or positive . . .
- ✓ Gask-O-Seals are available as standards and as specials in almost any configuration or to meet special requirements.

They are recommended for flanges, gear boxes, transfer cases . . . any place where truly efficient static seals are needed.

Note: A recent development of the Gask-O-Seal principle indicates effective sealing in the temperature ranges of -400° to $+1000^{\circ}$ for specific applications.

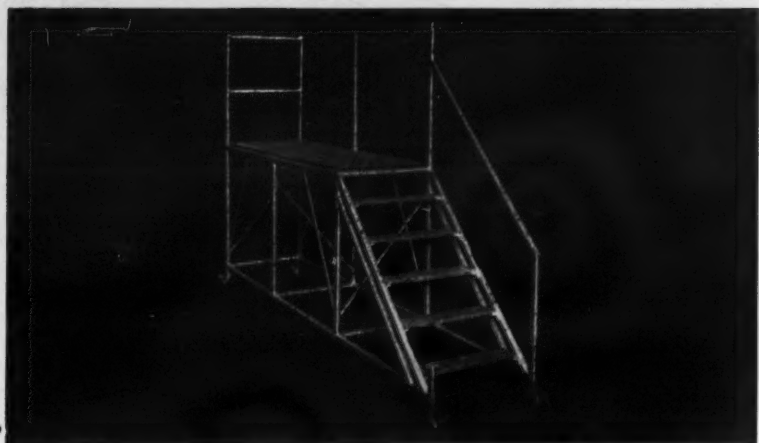


Parker
SEAL COMPANY

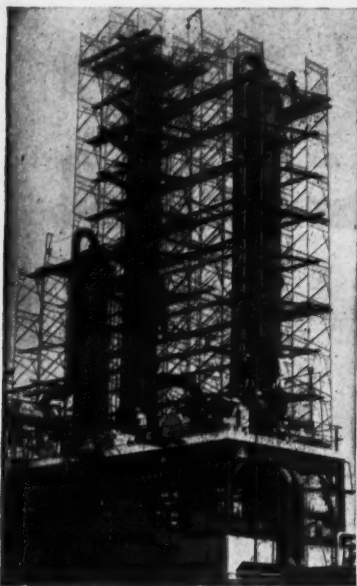
CULVER CITY, CALIF. • CLEVELAND, 12, OHIO
A DIVISION OF **Parker Hannifin** CORPORATION

Check 6705 opposite last page

Scaffolding Methods...by Patent Scaffolding Co.



MOVE IT AROUND—For jobs requiring a working surface at a fixed height 3' to 9' above ground or floor level, these aluminum work stands provide the portability of ladders, plus the extra safety and wider application of scaffolding. Ideally suited for reaching hard-to-get-to valves and gauges, inspecting and cleaning tanks, loading and unloading warehoused materials, speeding up a hundred other processing and maintenance jobs. Can be anchored where fixed platforms are required. Platforms of nonskid perforated aluminum vary from 2' to 4' in width, 2' to 8' in length. Special stands for special purposes can be supplied. Write for Bulletin AS-9.



PREFAB PLATFORMS—"Trouble Saver"® Sectional Steel Scaffolding is made of prefabricated frames, diagonal braces, bases and adjustable legs. Frames vary from 2' to 5' wide and from 3' to 6' high to provide proper heights and widths of working platforms to fit the job. Here, it gives maintenance crews easy, safe tower access.

Complete scaffolding equipment and engineering service offered through nation-wide sales offices or representatives. Look under Patent Scaffolding in the Yellow Pages for your nearest source.

SALES

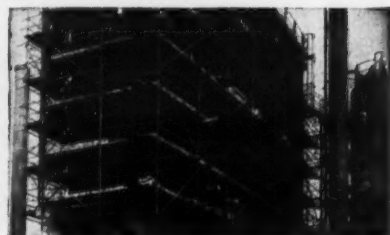
RENTALS

FOR GREATER SAFETY...EFFICIENCY...ECONOMY

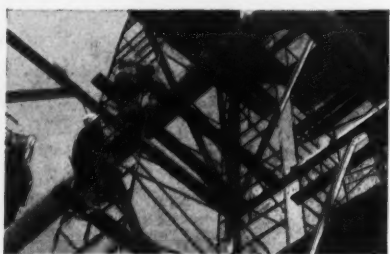
THE PATENT SCAFFOLDING CO., Inc.

38-21 12th St., Dept. CP, Long Island City 1, N. Y.
West Coast: 6931 Stanford Ave., Los Angeles 1, Calif.

In Canada: 355 Dufferin St., Toronto
Branches in all principal cities.



AT EVERY LEVEL—Versatile, all-purpose "Tubelox" Scaffolding provides working platforms at every level on coke drum and pipe still sections. Minimum wood staging is required.



EASY ACCESS—To get up and around heater units, workers quickly assemble "Trouble Saver" Scaffolding frames to exact heights. Built-in ladders speed the job by providing fast, easy access. Wood planks give necessary staging. 100% recoverable, "Trouble Saver" and "Tubelox" Scaffolding can be economically used indefinitely on many types of jobs.

CLIP COUPON TO YOUR LETTERHEAD

Send me literature on:

- ☐ "Tubelox"
☐ "Trouble Saver"

Your

Name

ENGINEERING & SAFETY

**Develop floor surfacing
with top resistance
to acid and water**

Possesses great strength;
resists rough treatment

Uses: As industrial floor surfacing.

Features: Material shows fine acid and water resistance while at the same time possessing great strength. It resists extreme abuse.

Description: Floor surfacing material combines air-cured resin with glass-fiber reinforcing. Material is applied by brush or trowel over surfaces of concrete or wood, may be used inside or outside, and is equally adaptable to maintenance of existing surfaces or new floor construction.

Normal applications require only an average depth of 1/16 to 1/8", thereby not affecting existing levels to any marked degree. Material feather-edges perfectly. Surfacing takes only an hour or two to harden and may be subjected to service as little as six hours after application. Flooring is available in two shades of gray and special colors can be fabricated on request.

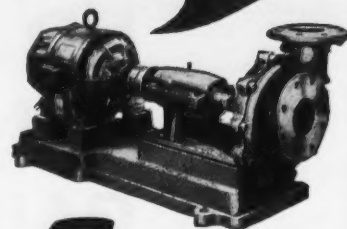
(Poly-Rock FG-777 is product of Plant Maintenance, Inc., 623 Green Rd., Cleveland 21, Ohio.)

Check 6707 opposite last page.



"Whoops, H - - - !"

Custom-built for
**EFFICIENT
DEPENDABLE
SERVICE**



**Frederick
SSV PUMPS**

Enclosed Impeller and Open Impeller Types

You're sure of maximum service and output with minimum maintenance or production down time with Frederick SSV Centrifugal Pumps because each pump is custom-made to fit your particular operation—whatever the consistency or type of liquid you're moving.

SSV PUMP FEATURES

- Pump sizes from 1" to 4" discharge openings.
- Pump capacities from 50 up to 700 U.S. GPM.
- Heads from 30 up to 220 feet.
- Pump speeds can be varied to suit the driving media and operating conditions.

CONSTRUCTION ADVANTAGES

Pump casings are vertically split for easy accessibility. Mounted on a swivel to permit placing discharge in any desirable position. Pump openings, both suction and discharge, flanged to permit easier connection and disconnecting to joints. One-piece impellers, securely attached to shaft by stout key and lock nut, or threaded, give long service. Pump bearings mounted in sturdy frame horizontally split for easier accessibility. Extra long stuffing box provides for oversize stuffing. Mechanical seal also available for minimum leakage. Pump coupling flexible for direct connection to drivers or can be arranged for belt drive. Pump speed, pump openings, etc. are selected to suit your particular requirements.

Write for Bulletin No. 107



FREDERICK IRON AND STEEL, INC.
FREDERICK Est. 1890 MARYLAND

Check 6708 opposite last page

CHEMICAL PROCESSING

Check 6706 opposite last page

NOW greater economy

LENAPE A.S.A. FLANGE *Plus*



LOW COST WELD END EXTENSION

For many pressure vessel requirements, progressive designers are specifying economical Lenape flanges and seamless weld end extensions in place of more costly long welding necks in I.D. sizes from 16" to 24".

Check these distinct advantages:

LENAPE FLANGES OFFER:

- Full I.D. opening for easier access and replacement of vessel internals.
- Wall thickness equivalent to more expensive Seamless Welding Necks.
- Special facings in solid material.
- Positive flange cost economy.

LENAPE SEAMLESS EXTENSIONS OFFER:

- Full I.D. opening free from constrictions imposed by pipe.
- Heavier walls than either pipe or rolled plate—greater corrosion and pressure resistance.
- No axial seam to be radiographed.
- Inherent reinforcement.

IN COMBINATION:

- Economy in lengths beyond 12" overall as compared to Seamless Welding Necks.
- Joining weld is X-rayable, in contrast to a slip-on flange.
- Extension may first be welded to vessel, then flange welded to extension without refacing the flange.

Write today for detailed specifications.

LENAPE
PRESSURE
VESSEL
CONNECTIONS

See our standard line of pressure vessel connections on pages 1128-1129 in the 1958 Chemical Engineering Catalog.

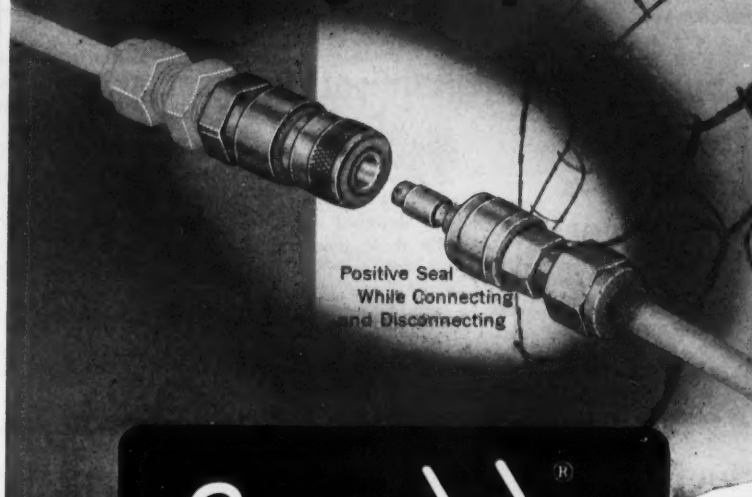
LENAPE HYDRAULIC PRESSING & FORGING CO.
DEPT. 100 WEST CHESTER, PA.

RED MAN PRODUCTS

Check 6709 opposite last page

AUGUST 1958

connect
disconnect
with finger-tip ease



Positive Seal
While Connecting
and Disconnecting

Swagelok
Quick Connect
Tube Fittings

With Swagelok Quick Connect there is no pressure drop during disconnection...no loss of pressure when the unit is disengaged.

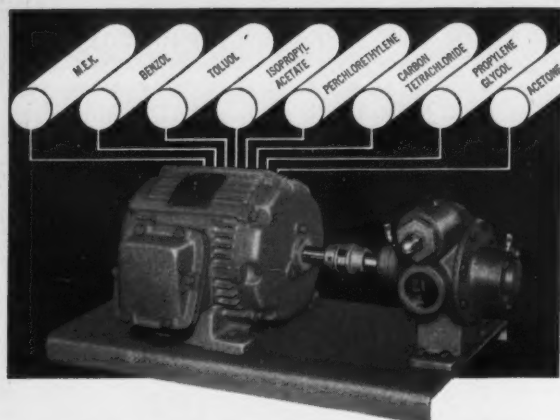
Compact design and swivel rotation at sealing point of Quick Connect permit greater mobility with portable units.

Swagelok Quick Connects can be used with both metal and plastic tubing.

For additional information write Dept. C4

CRAWFORD FITTING COMPANY • 884 East 140th Street • Cleveland 10, Ohio

Check 6710 opposite last page



PUMPS FOR SYNTHETIC SOLVENTS

- TRUCK PUMPS
- BULK PUMPS
- HAND PUMPS

If you're transferring or dispensing solvents, you'll move them more safely and efficiently with Blackmer bulk, truck, or hand pumps designed specifically to handle these types of liquids. Write for Bulletins 110, 200, and 310.



"liquid materials handling" equipment

BLACKMER

BLACKMER PUMP COMPANY, GRAND RAPIDS 9, MICH.

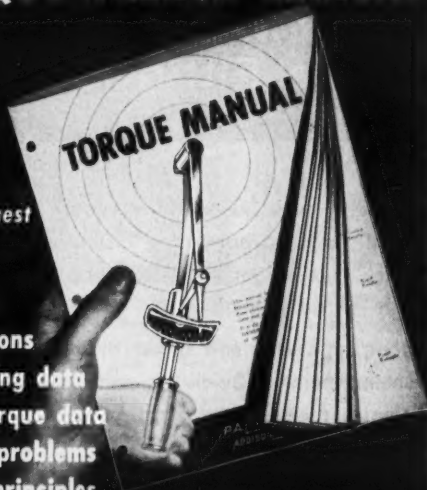
See Yellow pages for your local sales representative

Check 6711 opposite last page

"TORQUE WRENCH" MANUAL

Sent upon request

Formulas
Applications
Engineering data
Screw torque data
Adapter problems
General principles



P.A. **STURTEVANT CO.**
ADDISON QUALITY ILLINOIS

Manufacturers of over 85% of the torque wrenches used in industry

Check 6712 opposite last page



new literature

Industrial bulletins pertinent to the reader . . . offering data on products, processes, services. Additional reviews of catalogs, bulletins, data sheets, etc., are found throughout other sections of this magazine

On fire protection

Bulletin of 44 pages illustrates and describes fire protection systems including water spray, foam, carbon dioxide, and dry chemical. A quick selector chart listing the most used extinguishing agents for specific hazards is included. Fire protection bulletin — Grinnell Co., Inc. 200 West Exchange St., Providence 1, Rhode Island.

Check 6713 opposite last page.

Corrosion-resistant drive

Features, operating principles, and adaptability of corrosion-resisting variable-speed drive are detailed in four-page Bulletin M-578 — Reeves Pulley Co., Div. of Reliance Electric and Engineering Co., Columbus, Indiana.

Check 6714 opposite last page.

Adsorption, dehydration

Up-to-date technical data on adsorption and dehydration with silica gel are presented in text and graph form in illustrated, 20-page Tech Bul 202 — Davison Chemical Company, Div. of W. R. Grace & Co., Baltimore 3, Md.

Check 6514 opposite last page.

Dryer-blender uses

Operating mechanics and uses of glassed-steel conical dryer-blender are described in 12-page booklet which tells how glassed-steel unit can reduce drying time as it blends. Bul 956 — The Pfaudler Co., a div. of Pfaudler Permutit Inc., 1060 West Ave., Rochester, N. Y.

Check 6715 opposite last page.

The 42 LB.

GRIPHOIST

TIRFOR

LIFTS • PULLS
LOWERS
3300 LBS.
Single Line
6 TONS
OR MORE
with pulley blocks

Unlimited cable travel
... Portable ... Hand Operated

Standard equipment with refineries, engineering contractors, mines, pile drivers, railways, electricians, telephone and utility cos., steel erectors, plumbers, sawmills, all rigging.

One Year Written Guarantee

East of Mississippi
Princeton Griphoist, Inc.
32 George Street
Boston 19, Mass.

West of Mississippi
Griphoist, Inc.
424 Bryant Street
San Francisco 7, Calif.

1/2" wire rope

3,300 LBS.

Check 6716 opposite last page

make

your headquarters
for **STANDARD**
or **SPECIAL**
HEAT
TRANSFER
UNITS

STANDARD SK Type "BD" Heat Exchanger, two-pass design for service in petroleum, power, chemical processing, and other industries. Also made in single-pass design.

SPECIAL SK Radiant Air Cooler, one of two large coolers designed and manufactured for a special project. SK welcomes inquiries for special units—willingly offers experienced assistance.

Get Full Details. Write for Bulletin HT-1.

Schutte and Koerting

COMPANY
MANUFACTURING ENGINEERS

2215 STATE ROAD, CORNWELLS HEIGHTS, BUCKS COUNTY, PA.

Jet Apparatus:
Ask for
Bulletin 11

Rotameters & Flow
Indicators: Ask
for Condensed
Bulletin 18-NA

Valves: Ask for
Condensed Bulletin
18-1

Heat Transfer
Apparatus: Ask
for Condensed
Bulletin HT-1

Gear Pumps: Ask
for Bulletin 17-A

Check 6717 opposite last page

CHEMICAL PROCESSING

Radioactivity counting

A 13-point comparison of seven main counting systems used for detecting and measuring radioactivity is outlined in data sheet. Text goes into detail on features of manufacturer's proportional counters, and their fields of application. Data Sheet PC-58—Nuclear Measurements Corp., 2460 N. Arlington Ave., Indianapolis 18, Indiana.

Check 6718 opposite last page.

Punch card reader

Illustrated data sheet gives full details on how formula changeovers are made and describes punched card reader for automatic control of blending, batching, and proportioning operations. Unit is designed for use with electronic proportioning systems. Data Sheet 5705—Richardson Scale Company, Clifton, N.J.

Check 6719 opposite last page.

Polyethylene resin uses

Book of 36 pages explains how polyethylene resins can be used to make functional and attractive plastic products. Separate sections cover the six basic uses: molding, pipe, film, coatings, blowing, and wire and cable covering. "Tenite Polyethylene"—Eastman Chemical Products, Inc., Sub. of Eastman Kodak Co., 260 Madison Ave., New York 16, N. Y.

Check 6720 opposite last page.

X-ray analysis

Booklet of 12 pages on X-ray analysis covers principles of operation and uses simple diagrams to illustrate basic differences between: film diffraction, diffractometry, and spectrography. "X-ray Analysis Theory & Instrumentation"—Instruments Div., Philips Electronics, Inc., 750 S. Fulton Ave., Mt. Vernon, New York.

Check 6721 opposite last page.

Water Purity

• FOR EVERY NEED •

American Sterilizer WATER STILLS

- * ½ to 500 gallons per hour Evaporator capacity range.
- * Steam, Electric or Gas heated installations . . . Kerosene or Gasoline heated Portable Units.
- * Fully automatic or manual controls.
- * Single, Double and Triple distilling systems.
- * Storage Tank capacities from 5 to 1000 gallons.
- * All internal parts heavily coated with pure block tin. Stainless steel, Aluminum or special alloys also available.

Thousands of Amsco Water Stills in laboratories, industrial or processing plants and hospitals throughout the world are producing distilled water of the very highest purity . . . economically, dependably and efficiently.

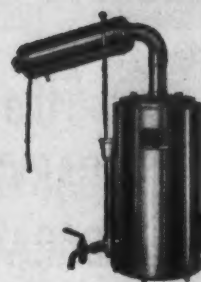
Whether the distillate quantity is small or large . . . for exacting laboratory experiments, or for mass processing . . . the purity of water is the same, exceeding the standard set up by the United States Pharmacopeia.

Whatever your water conditions or distillate requirements there is an Amsco distilling system especially adapted to your needs. Write for detailed information . . . Bulletin IC-601.

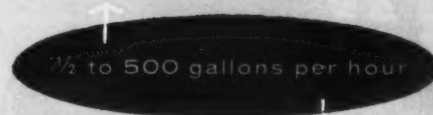


AMERICAN
STERILIZER

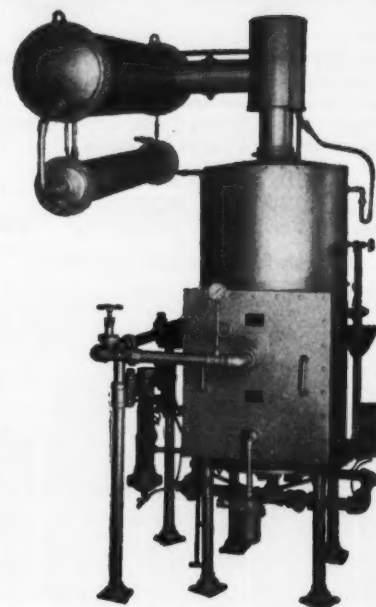
ERIE • PENNSYLVANIA



Typical Laboratory Still: Electric heated. ½ to 10 gallons per hour capacity.



½ to 500 gallons per hour



Typical Industrial Unit: Mass production steam heated Still with automatic controls. 50 to 500 gallons per hour capacity.

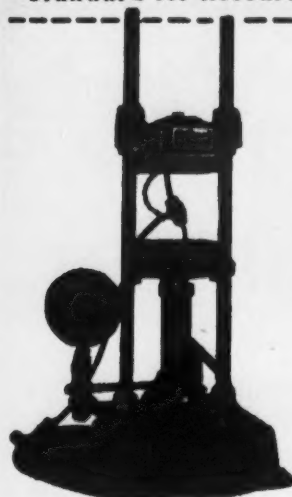
Deionizers . . .

5 to 1000 gallons per hour . . . with cation or anion resin in single bed or dual bed arrangement.

INDUSTRIAL and SCIENTIFIC DIVISION

Check 6722 opposite last page

Standard for Research and Development



the CARVER LABORATORY PRESS



... wherever Pressing is required.

Accurately controlled pressures to 20,000 lbs., 6-inch gauge mounted on base. Carver Standard Accessories include Electric or Steam Hot Plates, Carver Test Cylinders, Swivel Bearing Plates, Cage Equipment. Available from stock. Write for catalog.

FRED S. CARVER INC.
HYDRAULIC EQUIPMENT
52 RIVER ROAD, SUMMIT, N.J.

Check 6723 opposite last page

**JUST
RELEASED**

CATALOG 1D-100B

UNIVERSAL
All-Metal Flexible Hose
Catalog 1D-100B

UNIVERSAL METAL HOSE COMPANY
2189 SO. KEDZIE AVE. • CHICAGO 23, ILL.

Write
for Your
Copy

Check 6724 opposite last page

NEW LITERATURE

Relief valve data

Pilot operated pressure and vacuum relief valves for cone roof and other low pressure tanks are described in six-page illustrated bulletin that thoroughly covers valve operation. Bul 581 — The Johnston & Jennings Co., Div. of Pettibone Mulliken Corp., 6917 Bessemer Ave., Cleveland 27, Ohio.

Check 6725 opposite last page.

Weight fact kit

Manufacturer is offering kit to help detect and correct weighing inefficiencies in your plant. Weight Fact Kit — Toledo Scale, Div. of Toledo Scale Corp., 1423 Telegraph Rd., Toledo 12, Ohio.

Check 6544 opposite last page.

Sulfur dioxide booklet

Booklet of 16 pages on sulfur dioxide includes physical and chemical properties, specifications, and specification test methods, suggested uses, toxicity, and shipping and handling procedures for sulfur dioxide. Form C5737 — Ansul Chemical Co., Marinette, Wis.

Check 6726 opposite last page.

ZENITH RUBBER CO.



"Find a sponsor for your ball team yet?"

This Exclusive SURETY GLOVE COMBINATION SOLVES MORE HAND PROTECTION PROBLEMS

than any other
we know

SURETY

SURESEAL
(HYCAR)

**TURN-CUFF
INDUSTRIAL GLOVES**

Tests prove Sureseal's amazing long life—ten times and more wear than other materials. Since Surety makes gloves from all materials you may be sure of test impartiality. Adding Surety's famous safety feature, Turn-Cuffs, the barrier to dangerous liquids, provides the maximum hand safety and comfort to make willing hands and willing workers. Ask your jobber or write Dept. C.P., The Surety Rubber Co., Carrollton, Ohio.



TEST

at our expense
Send for slide rule showing gloves best to resist chemicals, acids, oils, solvents, etc. Tell us your glove need, too... we'll send sample pair.

In Canada: Safety Supply Co., Toronto

Check 6727 opposite last page

Drive out FOUL AIR Blow in FRESH AIR with Coppus Type A Ventilator



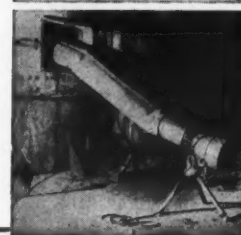
Assure greater safety, comfort for workers... get greater efficiency.

Drive out dangerous fumes, gases, stagnant or hot air from boilers, cable manholes, tanks, vats and other confined places. Supply fresh air continuously.

Send now for further information. Coppus Engineering Corporation, 388 Park Avenue, Worcester 2, Mass.

MANHOLES made safe for workers' entrance within minutes.

BOILER AND TANK INTERIORS cooled by Coppus. Fresh air supplied continuously.



ANOTHER
COPPUS
"BLUE RIBBON" PRODUCT

Check 6728 opposite last page

CHEMICAL PROCESSING

NEW LITERATURE

Flexibilizer data

Emphasizing corrosion and chemical resistance, data sheets give properties, applications of epoxy resin flexibilizer. Data Sheets — Irvington Chemical Div., Minnesota Mining and Mfg. Company, 500 Doremus Ave., Newark 5, New Jersey.

Check 6729 opposite last page.

Air pollution control

Brochure gives facts and figures on typical installations for air pollution control and waste heat recovery. Oxy-Catalyst, Inc., Wayne 7, Pa.

Check 6549 opposite last page.

Describes tank truck

Tank truck designed for minimum maintenance and faster fuel delivery is described in manufacturer's six-page brochure. Illustrated brochure outlines special design and construction features. Tank Truck Bul — Farrell Manufacturing Company, 804 E. Cass St., Joliet, Ill.

Check 6730 opposite last page.

For model makers

Companies recognizing the value of scale models as an engineering tool and wishing to establish their own model-making facilities will be interested in this 44-page catalog of model components. Cat 58 — Engineering Model Associates, PO Box 22020, Los Angeles 22, Calif.

Check 6731 opposite last page.

Chromatograms

Full details on manufacturer's automatic system for scanning radioactive zones on strip chromatograms are presented in four-page illustrated publication. "The Nucleus," January 1958 — Nuclear-Chicago Corp., 223 W. Erie St., Chicago 10, Illinois.

Check 6732 opposite last page.

NOW AT LAST! for Orig. Eqpt. Mfrs.

A low-cost chemical-resistant plastic pump that features:

- No stuffing boxes
- No shaft seals
- No valves or gaskets
- Self-priming
- Non-contaminating
- Non-agitating
- Operates wet or dry

Designed to give complete protection against leakage, corrosion, and maintenance problems.

Available close-coupled (shown here), foot-mounted, face-mounted, or special on request.

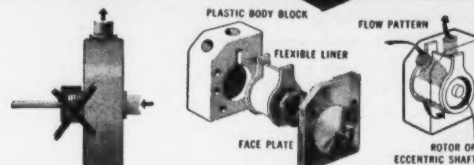
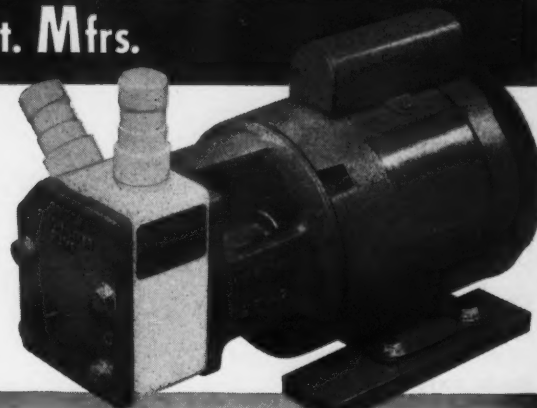
This new Vanton pump is designed to provide the equipment manufacturer with a low-cost, versatile, simple yet carefully engineered unit, problem-free with minimum maintenance. Construction materials at present available include PVC, high-temperature polyethylene, Teflon*, Buna N, bakelite, or stainless steel, in capacities from 1/3-10GPM. For information, write for BULLETIN CC10.1.

*Reg. trade mark of E. I. DuPont & Co.



VANTON PUMP
and Equipment Corp. • Hillside, N. J.
DIVISION OF COOPER ALLOY CORP.

Check 6733 opposite last page



Basic Vanton Design removes the problems associated with stuffing boxes and shaft seals by eliminating the seals themselves. All fluid moves in a channel formed by the outside of a flexible rubber or synthetic liner, and the inside of a molded plastic or stainless block. Liner flanges are sealed as shown against the body block sides by end plates. Pumping mechanism is rotor mounted on eccentric shaft inside liner. At each revolution it creates a progressive squeegee action on the fluid trapped between liner and housing.

NEW-TYPE CHECK VALVE PROTECTS AGAINST OVERRANGE LOSS...

of any manometric fluid

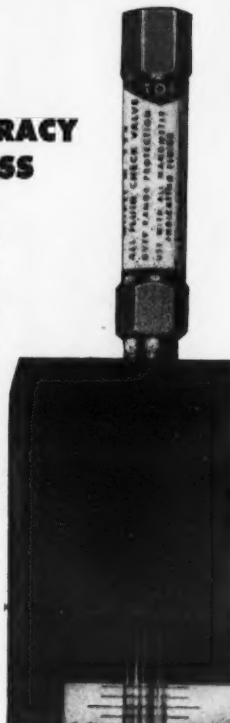
DOES NOT AFFECT INSTRUMENT ACCURACY OR RESPONSIVENESS

Based on a new design principle, the Meriam M-224 Float Check Valve effectively prevents loss of manometer indicating fluid due to overrange, either sudden or creeping. It is small and compact enough for mounting on multiple-tube units, will handle any manometric fluid.

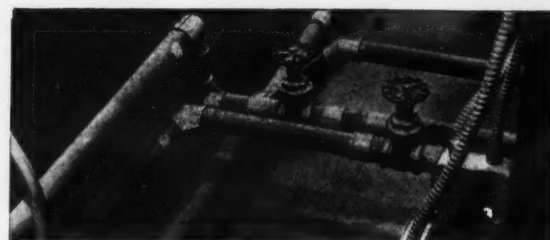
Tested for more than 20,000 cycles without a single failure, the valve will not cause "air block" or affect manometer accuracy. Rugged, corrosion-resistant construction throughout assures long-life serviceability.

In the lab or on the process line, the M-224 Float Check Valve is an essential accessory for all critical manometer applications.

WRITE FOR BULLETIN A-10
The MERIAM Instrument Co.
10920 Madison Ave., Cleveland 2, Ohio
S.A. 1778



Check 6734 opposite last page



CONSIDER COST...CONVENIENCE ...CORROSION-RESISTANCE...

and you'll specify

REPUBLIC SRK PLASTIC PIPE

Republic Semi-Rigid Kralastic Pipe meets a wide variety of chemical applications for several reasons:

Republic SRK Costs No More than ordinary pipe.

Convenience of Republic SRK makes installation easy. Light weight facilitates handling. Cutting requires only a handsaw. Joints are made with brush-applied welding solution and socket-type fittings. High strength withstands severe physical abuse.

Corrosion-resistance of Republic SRK plus the highest temperature resistance of any commonly used plastic pipe assure safety in handling many chemically active fluids. Also, Republic SRK is immune to electrolytic action.

For complete data on Republic SRK Plastic Pipe contact your nearest Republic office.

REPUBLIC STEEL

Cleveland 1, Ohio



Check 6735 opposite last page

NEW LITERATURE

Quick connect couplings

Catalog of 26 pages describes special quick connect/quick disconnect couplings for guided missile use and other special applications. Couplings Cat — Snap-Tite, Inc., Union City, Pennsylvania.

Check 6736 opposite last page.

Resin extender

Typical formulations for variety of solvent and melt-type coatings, as well as a description of sucrose ester's physical properties and performance characteristics are contained in manufacturer's bulletin. Chemical Sales Development Dept., Chemicals Division, Eastman Chemical Products, Inc., Kingsport, Tenn.

Check 6528 opposite last page.

Chemicals catalog

Organometallics, inorganic compounds, organic coatings, and metals and alloys are in eight-page Cat C57 — Metal & Thermit Corp., Rahway, New Jersey.

Check 6737 opposite last page.

Comparative valve guide

Series of three bulletins on manufacturer's valves, totaling 56 pages, covers construction, dimensions, applications, and prices. A comparative guide of chemical resistant characteristics of various metals and resilient seat materials is featured. Buls C-3, P-58, and 558 — Keystone Valve Corp., 5325 Kirby Dr., PO Box 6716, Houston 5, Tex.

Check 6738 opposite last page.

Steam team

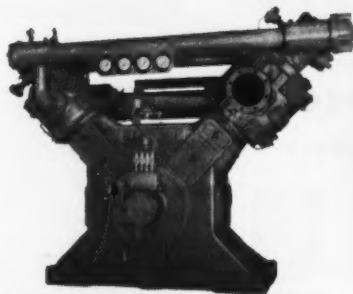
Manufacturer's impulse steam trap and fine screen strainer for installation on all types of steam equipment are detailed in Steam Trap Book—Yarnall-Waring Co., 125 Mermaid Ave., Philadelphia 18, Pa.

Check 6595 opposite last page.

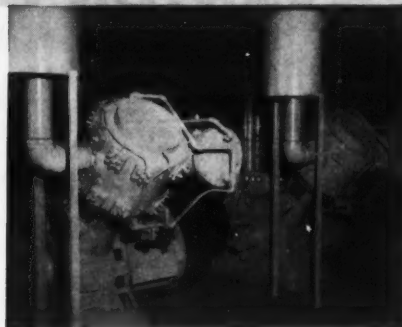
TYPE Y COMPRESSORS

- 75 to 250 horsepower
- For vacuum service and pressures to 5,000 pounds
- One to four stages of compression
- Built-in motor, coupled, and belt drive
- Simple, compact, widely adaptable, heavy-duty
- Built for "round-the-clock service" with minimum of attendance

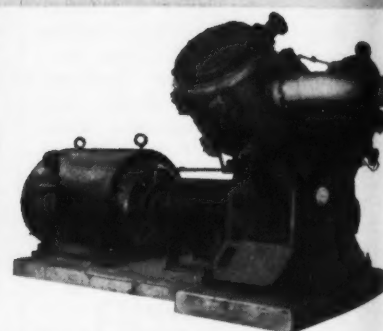
word for the Y's...



Four-stage high pressure unit available with flange-mounted, belted, or coupled drive.



Non-lubricated, two-stage compressor, with built-in motor, provides oil-free air for process work.



Butane compressor, direct coupled to an explosion-proof motor, in a prominent refinery.

THEY'RE ADAPTABLE



OTHER TYPE COMPRESSORS AVAILABLE

IN SIZES TO 5000 HP AND PRESSURES TO 15,000 PSIG.



Industry lungs

Belt-driven ventilating units with either forward curve wheels or backward blade, non-overloading wheels are described in this 12-page bulletin. Performance tables, engineering data, and specifications on 12 basic-size package ventilating fans are included. Bul UVS-104 — General Blower Company, Morton Grove, Ill.

Check 6740 opposite last page.

Gage information

Catalog provides complete information on line of gages for working pressures from 30" vacuum to 10,000 psi. Cat G-52 — Helicoid Gage Division, American Chain & Cable, 929-P Connecticut Ave., Bridgeport 2, Conn.

Check 6639 opposite last page.

Catalogs dial scales

Specifications including dial graduations, capacity, platform dimensions, and other data on manufacturer's types of dial scales are contained in illustrated booklet. Dial scale booklet — The Howe Scale Company, subsidiary of Safety Industries, Inc., Rutland, Vermont.

Check 6741 opposite last page.

Lab mixer data

Construction details, dimensions, and design features of manufacturer's mixer, designed specifically for laboratory studies and pilot plant work on dry or semi-dry materials, slurries, and heavy density liquids are covered in Bul 194 — Sprout, Waldron & Company, Inc., 130 Logan Street, Muncy, Pa.

Check 6742 opposite last page.

Chicago Pneumatic

8 East 44th Street, New York 17, New York

AIR AND GAS COMPRESSORS • VACUUM PUMPS • PNEUMATIC TOOLS • ELECTRIC TOOLS • DIESEL ENGINES • ROCK DRILLS • HYDRAULIC TOOLS

Check 6739 opposite last page

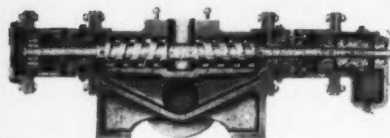
Sier-Bath SCREW PUMP

handling rubber adhesive with
VISCOSITY OF 1,500,000 SSU!

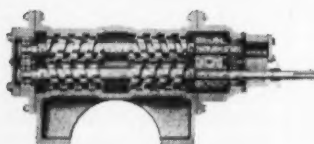


• This installation at Technical Tape Corp., Bronx, N. Y., demonstrates the extreme range and heavy duty service of Sier-Bath Screw Pumps. The pump discharges 2 gpm. against 100 psi and has operated satisfactorily for over 4 years. Pump is an external gear and bearing bracket type, coupled to 5 hp., 90 rpm. motor.

Sier-Bath SCREW PUMPS



External Gear and Bearing Bracket Type for non-lubricating liquids and semi-liquids



Internal Gear and Bearing Type for lubricating liquids and semi-liquids

Sier-Bath Screw Pumps maintain high volumetric efficiency because "Dual-Controlled" precision rotor design prevents rotor-to-rotor or rotor-to-casing contact—provides a continuous flow without pulsation, hammering or vibration . . . without strains, misalignment and wear on rotors, shafts, bearings and gears.

Result: Dependable, uninterrupted pumping service—less maintenance—easier servicing—longer pump life—lower overall pumping costs.

Capacities from 1 to 2,000 gpm.; viscosities from 32 SSU to 1,000,000 SSU; discharge to 1,000 psi. for viscous liquids, 200 psi. for water and light oils. Horizontal or vertical construction. Corrosion resistant alloys, special bodies, stuffing boxes and bearings for special needs. See "Yellow Pages" for your Sier-Bath representative or write Sier-Bath Gear & Pump Co., Inc., 9260 Hudson Blvd., North Bergen, N. J.

Sier-Bath ROTARY PUMPS



Screw Pumps

Genrex® Pumps

Hydrex® Pumps

Founded 1903

Mfrs. of Precision Gears, Rotary Pumps, Flexible Gear Couplings

Member A. G. M. A.

Check 6743 opposite last page

NEW LITERATURE

Potting, casting data

Four improved urethane potting and deep-casting compounds give excellent results in electrical uses. Four-page tech data sheet 102577 — National Aniline Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N.Y. Check 6744 opposite last page.

Flow control equipment

Detailed specifications, descriptions, and data on blinds, spacer rings, strainers, and pivot flanges are included in Cat A-7 — The Mack Iron Works Company, 122 Warren St., Sandusky, Ohio.

Check 6573 opposite last page.

X-ray accessories

Manufacturer's catalog of 56 pages lists X-ray accessories, isotope and inspection equipment, radiation protection and film processing equipment, and describes latest developments in processing tanks. 1958 Cat — Bar-Ray Products, Inc., 209-25th St., Brooklyn 32, New York.

Check 6745 opposite last page.

Separator performance

Describing manufacturer's separator, 16-page bulletin contains tables and graphs giving performance data as well as exploded views of equipment. Photos of field installations are also shown. Bul 1157 — Heyl & Patterson, Inc., 55 Fort Pitt Blvd., Pittsburgh 22, Pa.

Check 6746 opposite last page.

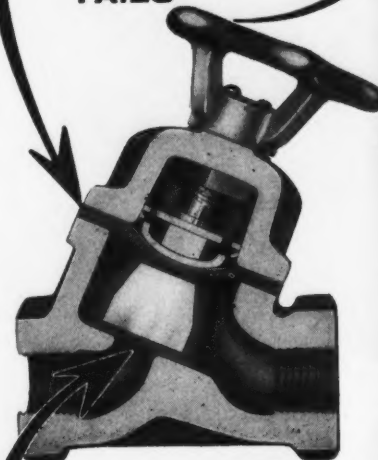
Safe climbing

Aluminum ladders designed to increase stability and safety in above-floor working conditions are described and illustrated in company folder. Ballymore company, West Chester 10, Pa.

Check 6694 opposite last page.

CLOSES TIGHT regardless

EVEN IF THIS
DIAPHRAGM
FAILS



THIS DISC
MAKES CLOSURE
POSITIVE - SURE

With Rockwell "D-D" Diaphragm Valves, you don't depend on the diaphragm to seal and shut-off fluid flow. This is done by the tight seating disc which will always close even should the diaphragm rupture in corrosive, abrasive, vacuum or other service.

The diaphragm serves a single purpose: to seal the valve's operating mechanism. It can be replaced without removing the valve from the line.

Rockwell "D-D" Valves provide other advantages: low closing torque; low pressure drop; high capacity; minimum maintenance. Available with lined and unlined bodies; flanged, threaded or with union ends. Get Bulletin 800.

You're **SURE** - You're **SAFE**
with **ROCKWELL**
"D-D" VALVES

W. S. ROCKWELL COMPANY

2208 ELIOT STREET
FAIRFIELD, CONN.

Check 6747 opposite last page
CHEMICAL PROCESSING



**G-W
FLOWMASTER**

**feeds
elevates
conveys**

Free running material moves quickly and efficiently through the Flowmaster on horizontal, inclined, or vertical planes in a substantially continuous stream.

A rugged endless chain moves a series of solid steel flights through a closely fitted casing that is totally enclosed, dust-proof and gas-tight (if necessary). Designed for continuous or intermittent operation, the Flowmaster is also self-loading to the proper capacity and self-discharging — which allows it to replace separate units for feeding and elevating.

Flowmasters are highly versatile and operate in a minimum space.

Mail the coupon below for your free copy of G-W's Idea Book on Materials Handling plus details on the Flowmaster.

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4847

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Hudson, New York

Please send me complete information on the Flowmaster, plus G-W's big "Idea Book" on materials handling.

Name _____
Company _____
Address _____
City _____ Zone _____ State _____

Check 6748 opposite last page

AUGUST 1958

NEW LITERATURE

Variable-speed drive info

Advantages, operation, and characteristics of manufacturer's variable-speed drives are explained in 32-page illustrated bulletin. Typical performance curves and block diagrams are shown on different types of rotary applications. Bul 10600 — The Oil-gear Company, 1560 West Pierce St., Milwaukee 4, Wis.

Check 6749 opposite last page.

Filtration equipment

Descriptive literature tells how properly engineered filtration equipment and techniques can improve product quality and cut processing costs. "Modern Filtration" — Industrial Filter & Pump Mfg. Co., 5908 Ogden Ave., Chicago 50, Ill.

Check 6565 opposite last page.

Fatty acid esters

Descriptions of edible and non-edible glycerol, glycol, and polyethylene glycol esters of higher fatty acids are contained in 24-page "Esters by Glyco" — Glyco Products Co., Inc., Empire State Bldg., New York 1, N.Y.

Check 6750 opposite last page.

Vacuum gages

Specifications of high-vacuum gages are presented in manufacturer's Data Sheet 561 — Vacuum Equipment Div., F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.

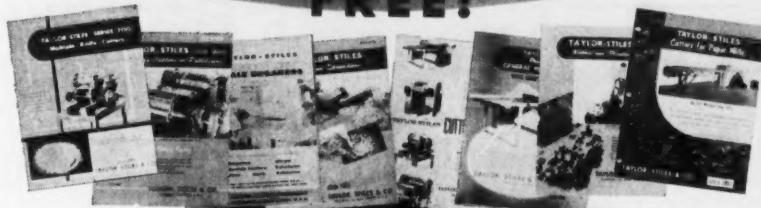
Check 6751 opposite last page.

For handling problems

Claimed to solve problems encountered in handling drums, kegs, paper rolls, and other cylindrical loads, boxes, and bales, manufacturer's clamp is described and specifications included in Form 1532 — Hyster Company, 1003 Myers Street, Danville, Ill.

Check 6752 opposite last page.

THESE Taylor-Stiles TECHNICAL BULLETINS FREE!



These eight Taylor-Stiles Technical Bulletins give up-to-date, detailed information on size reduction of many different products. They provide facts, that it pays to know, when confronted with a size reduction problem. Included are:

- Machine Specifications • Stock Lengths • Speed of Cutting Elements • Knife Arrangements • Capacities

No. 200 Lists All Taylor-Stiles Cutters, gives specifications. No. 202-Cutters for the Rubber Industry. Both light and heavy duty machines described. No. 203-Taylor-Stiles Cutters for Paper Mills, for cutting of rags, straw, bagasse, etc. No. 204-Taylor-Stiles Paper Shredders. For shredding office waste, newsprint, empty cartons, boxboard and confidential documents. No. 216-700 Series Multiple Knife Cutters. For Plastics. Machines cut up to twenty tons of uniformly-sized pellets per hour in sheet or rod form. No. 213-"Little Giant" Dicing Cutters. The operating principle of Taylor Stiles Cutters illustrated and explained. Specifications given. No. 212-General Purpose Precision Cutters. No. 215-Bale Breakers.

TAYLOR, STILES & CO., 20 BRIDGE STREET, RIEGELSVILLE, NEW JERSEY

GENTLEMEN:

SEND ME FREE COPIES OF THE TAYLOR-STILES TECHNICAL BULLETINS CHECKED BELOW:

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- ☐ No. 204 • PAPER SHREDDERS
- ☐ No. 216 • 700-SERIES-MULTIPLE KNIFE PLASTICS PELLETIZER
- ☐ No. 212 • GENERAL PURPOSE PRECISION CUTTERS
- ☐ No. 213 • LITTLE GIANT DICING CUTTERS & PELLETIZERS
- ☐ No. 215 • BALE BREAKERS

Name.....Position.....

Company.....

Address.....

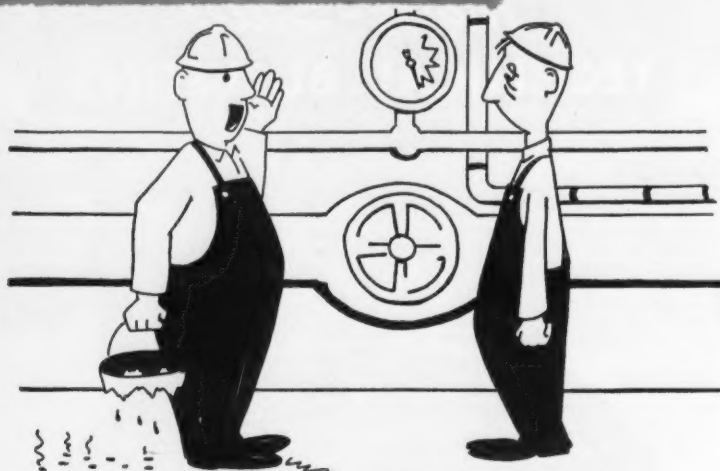
City.....Zone.....State.....

**TEAR
OUT
COUPON
AND
MAIL
TODAY**

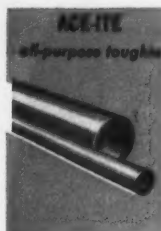
TAYLOR, STILES & COMPANY
20 BRIDGE STREET • RIEGELSVILLE, NEW JERSEY

Check 6753 opposite last page

Life in these excited states ...



"I said, I borrowed a pail of acid... O. K.?"



High-impact, rubber-plastic, most economical for average chemicals. $\frac{1}{2}$ to 6". Screw or solvent welded fittings. Valves $\frac{1}{2}$ to 2". NSF-approved. Bul. 80A.



Rubber or plastic lining is economical life insurance for costly "special" equipment. It's a specialty with ACE. Write for Bul. CE-53.



Choice of Rivclor PVC, Ace-ite rubber-plastic, Ace polyethylene or Ace Saran to match any plastic pipe. Sizes $\frac{1}{2}$ to 2". Also larger plastic-lined valves.



Ace-Hide, tough as a rhinoceros, insensitive to corrosives, makes this finest of acid pails. Also dippers, bottles, funnels, etc.

Time Can't Be Borrowed Either

Equipment running on borrowed time due to corrosion has a knack of dropping the bottom out of production when you can least afford it. No need to risk it... just specify Ace chemical resistant equipment. Best for the money anywhere... backed by 108 years' experience.

ACE processing equipment of rubber and plastics

AMERICAN HARD RUBBER COMPANY
DIVISION OF AMERACE CORPORATION
Ace Road • Butler, New Jersey

Check 6754 opposite last page

NEW LITERATURE

Required pump data

A data guide for specifying corrosion-resistant centrifugal pumps tabulates data essential for solution of pump problems and defines misunderstood terms and nomenclature used in the industry. How to calculate pump and system characteristics and use them to select correct pump size is included. Pump Data Guide — Ampco Metal, Inc., 1745 South 38th Street, Milwaukee 46, Wisconsin.

Check 6755 opposite last page.

Fans for severe service

Bulletin provides information on rubber-lined fans that have rubber vulcanized to all parts exposed to air stream. Manufacturer claims fans withstand many years of punishing service and save on down-time and parts replacement. Bul 2424-F — Buffalo Forge Company, 490 Broadway, Buffalo 4, New York.

Check 6583 opposite last page.

For metering corrosives

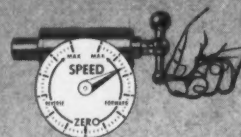
Capacity tables, dimensional, and other data are contained in manufacturer's bulletin which describes an insert-type Venturi flow nozzle, fabricated of glass-fiber-reinforced polyester plastic. Bul 125-P1 — Builders-Providence, Inc., div. of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R.I.

Check 6756 opposite last page.

Defines radioisotopes

Booklet of 20 pages provides, in simple and condensed form, some of the basic information on radioisotopes — what they are and how they are produced. Included are tables listing common radioisotopes and the elements. Tech Bul RP-1 — Commercial Products Div., Atomic Energy of Canada Ltd., PO Box 93, Ottawa, Canada.

Check 6757 opposite last page.



**GUARANTEED
GREATER
ACCURACY**

than any other
Variable Speed Drive



ONLY
Graham
most reliable variable
speed drive made
offers these...

BIG FOUR FEATURES!

- 1 UNLIMITED SPEED RANGE — from any desired maximum speed to zero, including reverse, without stopping motor.
- 2 UNMATCHED ACCURACY — of speed setting and re-setting, and of speed holding.
- 3 ULTIMATE in SIMPLICITY and COMPACTNESS — a straight line extension of a standard induction motor — or available without motor.
- 4 AUTOMATED SPEED CONTROL — control tension, proportion, synchronization, etc. from any control signal; 3 to 15 PSI, .5 to 5 ma, potentiometer, frequency, or binary signal from punch cards, tapes, or computers.



All this backed by
PROVED PERFORMANCE
to do a better job
for LESS MONEY!

GRAHAM TRANSMISSIONS, INC.
Dept. C P, Menomonee Falls, Wis.

Check 6758 opposite last page
CHEMICAL PROCESSING

Processing equipment

Descriptions and specifications of evaporators, dryers, flakers and cooling drums, autoclaves, kettles, and pilot plant and laboratory equipment are contained in manufacturer's 24-page Cat 380 — Bufllovak Equipment Div., Blaw-Knox Company, 1575 Fillmore Ave., Buffalo 11, N. Y.

Check 6759 opposite last page.

Mixing accuracy

According to manufacturer, uniform mix is assured, no matter how complicated the formula, by its mixer and blender for chemical materials. For descriptive literature — Rapids Machinery Company, 865 11th St., Marion, Iowa.

Check 6599 opposite last page.

Non-lubricated valves

Threaded valves featuring non-lubrication, full opening, and straight-through flow are covered in 20-page bulletin. Bul 1256 — Okadee Company, 332 South Michigan Ave., Chicago 4, Illinois.

Check 6760 opposite last page.

Screening, sizing

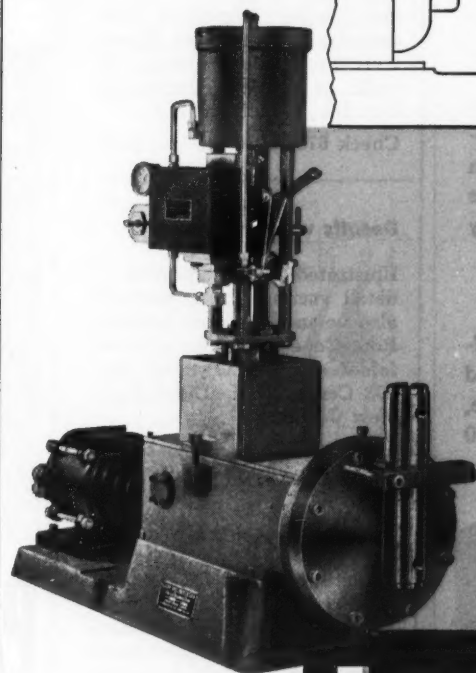
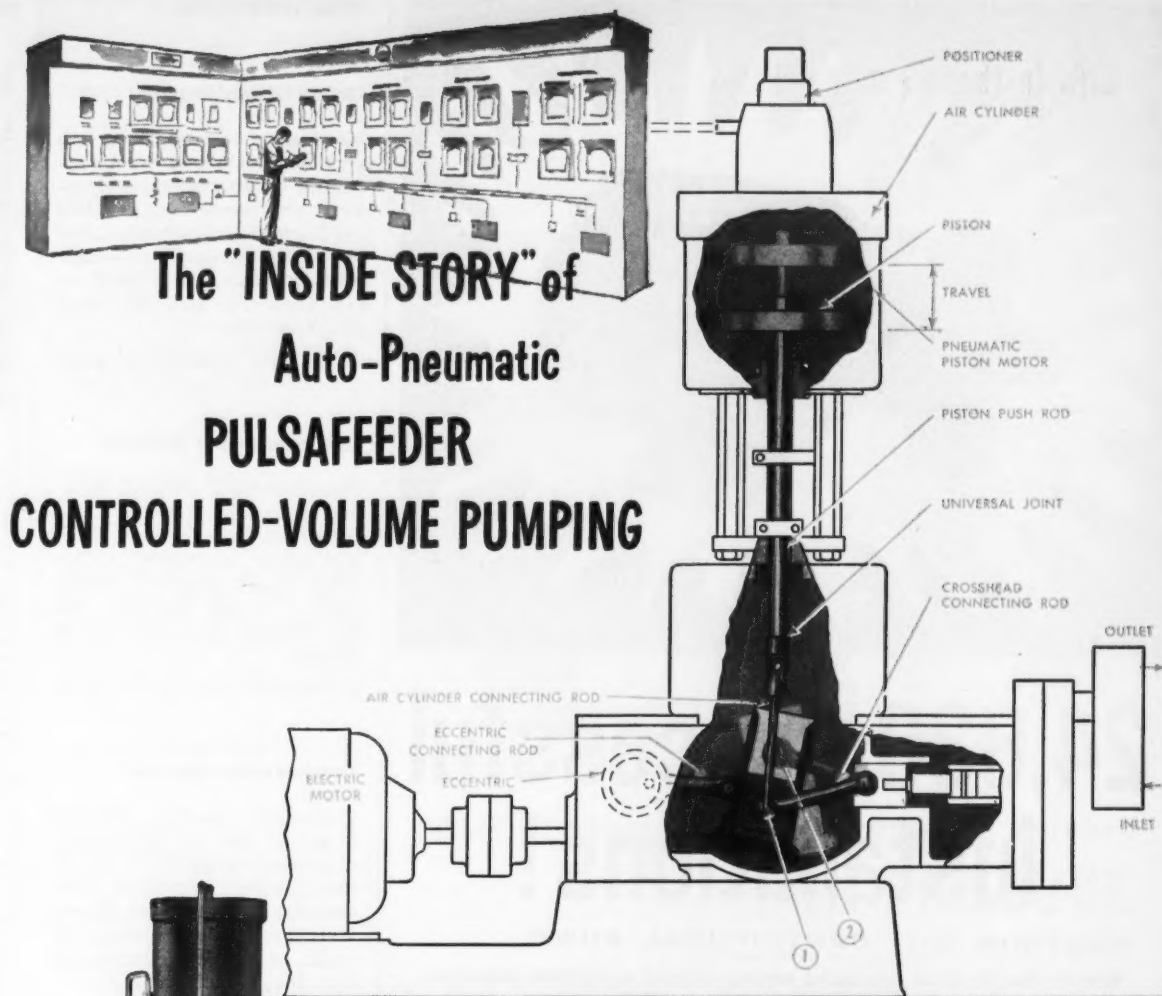
Bulletin of six pages provides details on sifter for single or multiple separations, as fine as 325 mesh, for laboratory or quantity production. Bul 503 — B. F. Gump Co., 1344 Cicero Ave., Chicago 50, Ill.

Check 6556 opposite last page.

Methanol information

A concise bulletin on methanol describes its varied applications, physical properties, and specifications. Chart shows properties of water-methanol solutions. Methanol Bul — Reichhold Chemicals, Inc., The Chemical Div., 525 N. Broadway, White Plains, New York.

Check 6761 opposite last page.

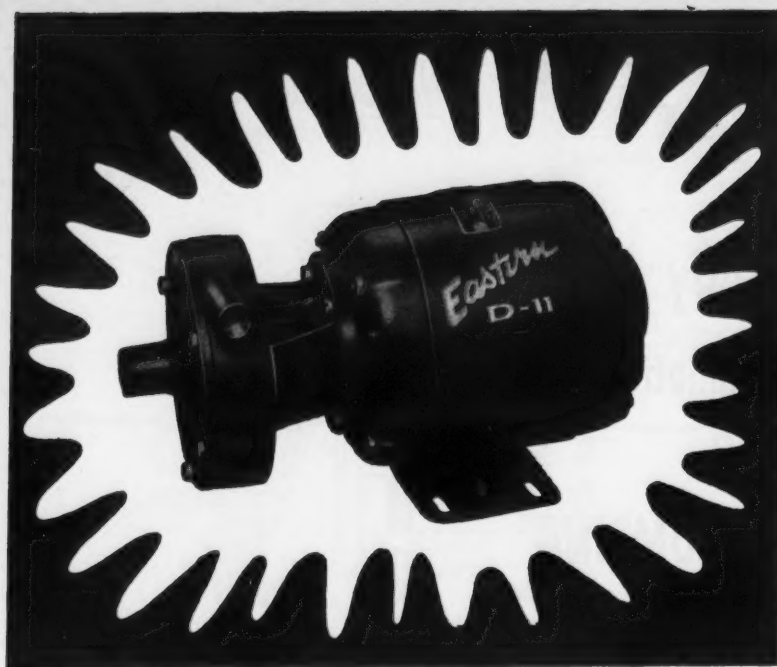


In many industrial processes, liquids must be metered in relation to some changing process condition. It can be a change in flow or pH, temperature or pressure. Instruments can sense such a change and transmit an air signal descriptive of that change. The auto-pneumatic control mounted on the Pulsafeeder pump receives and interprets this signal and automatically adjusts pump to meet the process variable. This is accomplished by a positioning device on the auto-pneumatic control that loads or unloads the air cylinder, accurately moving the air piston to position the connecting rod (1) in relation to the axis (2). This determines the stroke length of the pump—a longer stroke increases pump output; a shorter stroke reduces output. Instrument air pressure over a range of 3-15 psig. controls Pulsafeeder output from 0-100% of capacity. Ratio adjustment is available in all models.

WRITE FOR BULLETIN 443 with typical applications, flow charts, description and specifications of both MANUALLY CONTROLLED and AUTO-PNEUMATIC models of various capacities and constructions. Inquiry Data Sheet included from which we can make specific engineering recommendation for your processing requirement. Write Lapp Insulator Co., Inc., Process Equipment Div., 3501 Poplar St., Le Roy, N. Y.

Lapp

Check 6762 opposite last page



24,830 successful installations!

EASTERN D-11 CENTRIFUGAL PUMP

Why is the D-11 so successful among original equipment manufacturers? *Size and weight* make it ideal. The D-11 is the smallest, close-coupled, single-stage centrifugal pump available with an induction type motor. Eighteen pounds of compact design (9 $\frac{3}{4}$ " x 4 $\frac{3}{8}$ ") make it excel in industrial and process equipment, as well as laboratory service, and pilot plant operations.

SPECIAL METALS

A full selection of metals make the D-11 and other Eastern Centrifugal Pumps versatile performers. Available in 18-8 Type 303 and Type 316 Stainless Steel, Monel, Hastelloy "C", Cast Iron and Bronze, Eastern Pumps range from $\frac{1}{8}$ th to $\frac{3}{4}$ H.P. with capacities up to 70 G.P.M., pressures to 65 P.S.I.

For complete specifications on all Eastern Centrifugal Pumps, request Bulletin 120-F



Eastern



INDUSTRIES, INC.
100 Skiff St., Hamden 14, Conn.

Check 6763 opposite last page

NEW LITERATURE

On wet classification

Information on construction and application of manufacturer's classifiers and separators, plus combined grinding and wet classifying flow sheets, is contained in 24-page revised catalog. Bul 39-C — Hardinge Co., Inc., 240 Arch St., York, Pa.

Check 6764 opposite last page.

Lab equipment catalog

Manufacturer's 16-page catalog describes, pictures, and prices chromatography needs and other laboratory equipment. "Lab-oratory", March 1958 — Schaar and Co., 7300 W. Montrose Ave., Chicago 34, Illinois.

Check 6765 opposite last page.

Temperature control

Condensed catalog features complete line of differential-expansion temperature control instruments. Functions are described, construction shown, and specifications listed. Cat G-22 — Burling Instrument Co., Inc., Chatham, N.J.

Check 6766 opposite last page.

Details vacuum dryer

Illustrated folder describes in detail vacuum dryer that can also be used as cone blender. Rota-Cone Vacuum Dryer folder — Paul O. Abbé Inc., 402 Center Ave., Little Falls, New Jersey.

Check 6539 opposite last page.

For sanitary mixing

Bulletin of four pages provides specifications, dimensions, and capacities of manufacturer's ribbon-type blender for mixing powders, granulars, pastes, or liquids. Ribbon Blender Bul — The Falcon Mfg. Div., First Machinery Corp., 211 Tenth St., Brooklyn 15, New York.

Check 6767 opposite last page.

Threaded Specialties

lower cost
TEE BOLTS
by an
exclusive method

Among Pawtucket's many specialty products are these lower-cost tee-head bolts. Pawtucket's exclusive production method keeps cost low, dimensional accuracy unusually high and strength above standard. Pawtucket tee head bolts are made in standard sizes $\frac{1}{4}$ " and larger, or to your specifications. In any size, you can depend on a uniform Class 3 fit, if required.

All standard steels, stainless steels and non-ferrous metals, including Titanium



BETTER BOLTS SINCE 1882

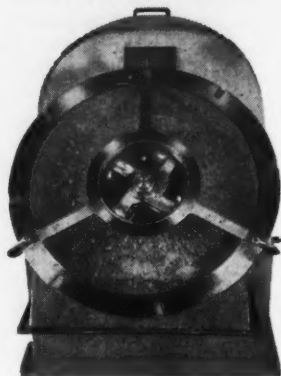
PAWTUCKET

MANUFACTURING COMPANY
327 Pine St. • Pawtucket, R. I.
THE PLACE TO SOLVE YOUR BOLT PROBLEMS
T.M. REG.

"The Bolt Man"

Check 6768 opposite last page
CHEMICAL PROCESSING

5600 RPM stopped at 1/5000 second



Rietz Angle Disintegrator with top removed for viewing illustrates 3 major advantages.

1. Efficiency of 360° screen:

demonstrated by even dispersion of disintegrated pulp in bowl area surrounding screen.

2. Hammer-like breaking action of rotor:

note unbroken material at moment of impact about to be disintegrated.

3. Rapid grinding action between rotor and screen:

demonstrated by large, cleared screen area between rotor hammers.

Rietz Angle Disintegrator applications include:

Wet or Dry Grinding of Difficult Materials—Fine Pulping—Shredding—Fine Dispersion—Blending—Homogenizing—Dissolving of Solids in Liquids

As a sanitary unit, available in 4" to 18" rotor diameters, it finds a wide range of applications in both food and chemical industries.

Literature on Rietz Angle Disintegrators may be obtained from Rietz Manufacturing Company at either West Chester, Pennsylvania or Santa Rosa, California.

Check 6769 opposite last page

NEW LITERATURE

Belt conveyor manual

Comprehensive manual covers all but the most unusual conveyor applications and serves as handy reference for specifying the right conveyor. Valuable data on conveyor components and accessories are included. Manual 909 — The Jeffrey Manufacturing Company, Columbus 16, Ohio.

Check 6770 opposite last page

Lists optical parts

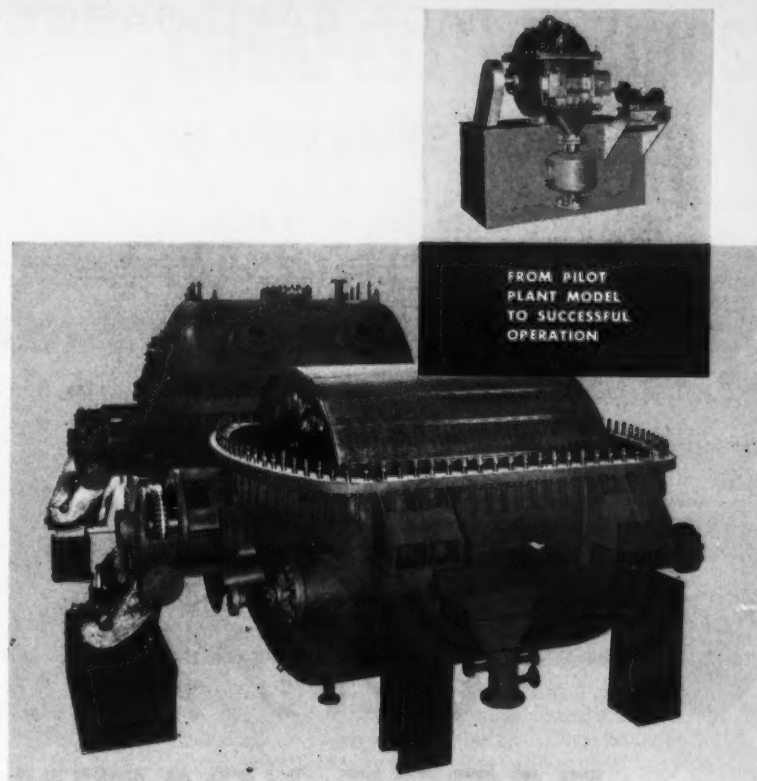
Catalog of 16 pages contains information on full line of unmounted optical parts, including lenses, prisms, and reflectors. Special section describes quartz and other special optical parts. Cat L-117 — Bausch & Lomb Optical Co., Rochester 2, N. Y.

Check 6771 opposite last page.

For more information on developments reported in this section, check corresponding numbers on Reader Service Slip opposite last page of this issue.



"She's sure of her job . . . automation could NEVER replace her qualifications!"



G-B Rotary Drum Pressure Filters for HIGH PRESSURE

This new filter was originally developed for the lubricating oil industry where high pressure is necessary to keep the solvents used from flashing. The two units shown above were recently installed in a foreign country for a propane dewaxing plant.

This filter has now been adapted for other uses such as high energy boron fuels, refractory materials and other high pressure, high temperature applications. It is available from 6 sq. ft. to 400 sq. feet and in pressures to 150 psig. Stainless steel, monel or nickel construction may be used in addition to mild steel. A 6 sq. ft. pilot plant model in stainless steel is available for rent as shown in the inset above.



GOSLIN-BIRMINGHAM
MANUFACTURING CO., INC.
BIRMINGHAM, ALABAMA

**FILTERS • EVAPORATORS
PROCESS EQUIPMENT
CONTRACT MANUFACTURING
including HEAVY CASTINGS**

Check 6772 opposite last page

FOR FAST, SAFE BARGE LOADING

Clear the docks!



New **CHIKSAN** BARGE LOADING ARM

SAVES ON

*Line Handling Injuries
Dock Clutter
Lengthy Hookup Time
Hose Bursts
Replacement Costs*



This newly developed barge loading arm ends hazardous manhandling of loading hoses, eliminates dangerous dock clutter. Mechanical operation makes hookup fast and simple...one man can handle the job in minutes with no physical strain.

Ball bearing swivel joints make it possible to rotate the arm to meet varying flange locations. After arm is flanged to barge riser, it can be left unattended. Arm will automatically conform to the various positions of the barge as loading or unloading is carried out. When not in use the operation arm can be raised up and out of dockside traffic.

Write For Illustrated Literature

CHIKSAN



A SUBSIDIARY OF FOOD MACHINERY AND CHEMICAL CORPORATION



CHIKSAN COMPANY—BREA, CALIFORNIA • CHICAGO 5, ILLINOIS • NEWARK 2, NEW JERSEY

Well Equipment Mfg. Corp. (Division) Houston 1, Texas • Chiksan Export Company • Chiksan of Canada, Ltd., Edmonton, Alta.

Check 6773 opposite last page

NEW LITERATURE

Pump problems?

Bulletins provide information on vertical (Bul V-837) and horizontal (Bul C-355) pumps for handling chemicals. Taber Pump Co., 291 Elm St., Buffalo 3, New York.

Check 6457 opposite last page.

Lab ovens

Laboratory ovens, furnaces, and utility baths with mechanical refrigeration are described and illustrated in four-page Bul 5720 — Chicago Apparatus Co., 1735 North Ashland Ave., Chicago 22, Illinois.

Check 6774 opposite last page.

Pressure pipe system

Bulletin of 48 pages summarizes and correlates various specifications as an aid in computing the minimum safety requirements for the designing of a pressure pipe system. Bul FB-77 may be obtained by letterhead request to Tubular Products Div., The Babcock & Wilcox Co., Beaver Falls, Pa.

Measures dew points

Illustrated bulletin of eight pages describes instrument which uses principle of varying pressure, rather than temperature, in determining dew points of any gas sample. Bul 2051 — Illinois Testing Laboratories, Inc., 420 North LaSalle Street, Chicago 10, Ill.

Check 6775 opposite last page.

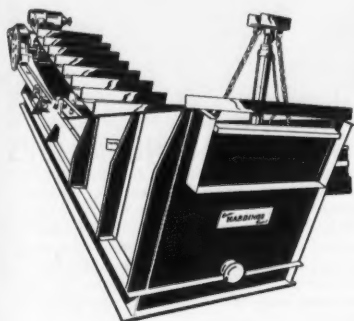
'Inside' crawler tractor

Operating advantages and engineering features of manufacturer's diesel powered tractor are described in 14-page illustrated Cat MS-1251 — Construction Machinery Div., Allis-Chalmers Manufacturing Company, Box 512, Milwaukee 1, Wis.

Check 6776 opposite last page.

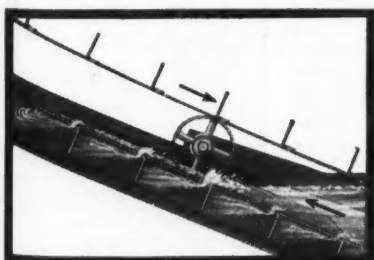
CHEMICAL PROCESSING

CLEANER SANDS, more efficient de-sliming . . . with the "OVERDRAIN" Classifier —



The "Overdrain" Classifier is a completely new device in the field of mechanical wet classifiers. The belt, with lifting flights attached beneath, moves upwardly out of the sand bed between two stationary side shrouds—creating the effect of a series of moving, closed, washing compartments.

The only outlet from these compartments is via holes in the belt above. Surplus liquid and slimes discharge through these "overdrain" holes without mixing with the oncoming sands. The end result is an extremely clean sand discharge, excellent de-sliming—making the "Overdrain" Classifier an ideal washing device.



Section through "Overdrain" Classifier showing upward-moving, closed, washing compartments.

Write for Bulletin 39-C-13.

HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA • 240 ARCH ST. • Main Office and Works
New York • Toronto • Chicago • Milwaukee • St. Louis • Salt Lake City • San Francisco • Birmingham • Jacksonville Beach

Check 6777 opposite last page

NEW LITERATURE

Steam jet bulletin

Corrosion-resisting steam jets for heating, circulation, agitation, and digestion are described in manufacturer's 12-page bulletin which includes dimensional drawings and specifications. Bul M/5 — The Duriron Co., Inc., Dayton 1, Ohio.

Check 6778 opposite last page.

Pilot plant filters

Bulletin of eight pages illustrates, describes and presents specifications on pilot plant filters for the process industries. Units are also available on monthly rental basis. Bul KSI-2 — Komline-Sanderson Engineering Corp., Peapack, N. J.

Check 6779 opposite last page.

Scaffolding data

Movable scaffolding, sectional steel prefabricated frames, and tube-type scaffolding are described, and applications shown, in manufacturer's literature "Tubelox" and "Trouble Saver" — The Patent Scaffolding Co., Inc., 38-21 12th St., Dept. CP, Long Island City 1, New York.

Check 6706 opposite last page.

Sodium ferrocyanide data

Specs, uses, physical properties, other pertinent data on sodium ferrocyanide are in four-page Tech Bul 200 — Henry Bower Chemical Mfg. Co., Grays Ferry Rd., and 29th St., Philadelphia 46, Pa.

Check 6780 opposite last page.

Power supply catalog

Complete line of DC power supplies, AC line voltage regulators, and static inverters are illustrated and described in eight-page Cat E-58 — Perkin Engineering Corp., 345 Kansas St., El Segundo, Calif.

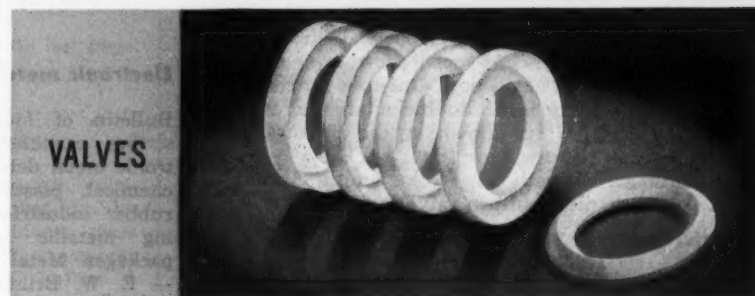
Check 6781 opposite last page.

CHEAPEST PACKINGS in corrosive service

cost less per month of life

cost less in shutdown time

cost less in maintenance labor



Chemiseal† Valve Packings, made of du Pont TEFLON, are available in V-type, diagonal, triangular, conical and Garlock Chevron* ring designs. They last months and years in chemical services where other packing materials fail in hours. They seal at low gland pressure and reduce torque required to operate the valve.



Chemiseal Pump Packings offer remarkably trouble-free service and useful life many times that of other type packings.

Molded from pure shredded TEFLON with TEFLON suspensoid, Garlock No. 9167, for positively non-contaminating service. (Also supplied graphited for general chemical applications.) They provide a low friction 2-way seal not only preventing axial seepage but seal against both shaft and stuffing box as well.

†U.S.G. trademark
*Garlock trademark

For prompt service, contact one of The Garlock Packing Company's 30 sales offices and warehouses throughout the U.S. and Canada, or write

United States Gasket Company
Camden 1, New Jersey

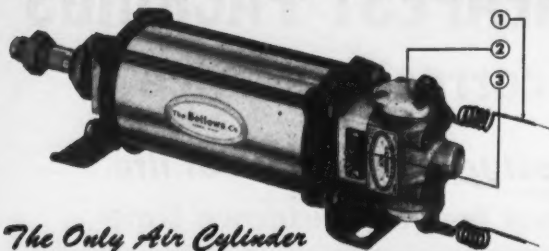
**United
States
Gasket**

Plastics Division of
GARLOCK



Check 6782 opposite last page

LOW COST AIR CYLINDER



The Only Air Cylinder

WITH ALL CONTROLS BUILT-IN

This air cylinder is a complete, "packaged" power unit. Electrical switching controls (1), four-way directional valve (2), and independent speed control valves (3), are all a built-in part of the unit. Only one air connection required yet unit is full double-acting. So revolutionary in design it is known as the Bellows Air Motor. Available in five bore sizes: 1 1/4", 1 3/4", 2 1/2", 3 3/8" and 4 1/2". Virtually any stroke length. Optional choice of mechanical built-in valve controls.

Write today for free 4-color Booklet

Address Dept. CP858. Ask for Bulletin BA-25. In Canada, write Bellows Pneumatic Products of Canada, Ltd., Toronto, Ontario.



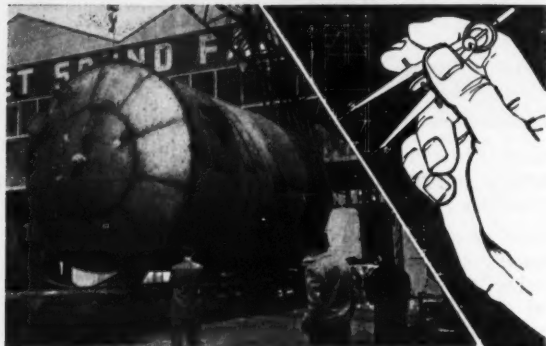
739-B

The Bellows Co.

AKRON 9, OHIO

Check 6783 opposite last page

from blueprint plans PUGET SOUND FABRICATES PROCESS VESSELS



Nickel-clad caustic storage tank for western chemical plant

... for the Chemical Processing Industry on the West Coast.

You can save on transportation costs, manufacturing time and gain the dependability of over 58 years of custom fabricating experience when you call on Puget Sound as your West Coast source for process and plant equipment in steel plate and alloys up to 1". Send prints for prompt quotation on your next job.

Request Brochure No. M-58



**PUGET SOUND
FABRICATORS, INC.**

Craftsmen in Metals

3670 E. Marginal Way • Seattle 4, Washington

Check 6784 opposite last page

NEW LITERATURE

Lubricant pump data

Catalog of 32 pages features line of air-motor operated lubricant pumps. Design and engineering data are covered, and performance and selection charts included. Cat 65 — Lincoln Engineering Co., 5780 Natural Bridge Ave., St. Louis 20, Missouri.

Check 6785 opposite last page.

Electronic metal detector

Bulletin of four pages describes manufacturer's electronic metal detectors used in chemical, plastics, food, and rubber industries for detecting metallic impurities in packages. Metal Detector Bul — E. W. Brilmayer Laboratories, Inc., 86 Fulton St., New York 38, N. Y.

Check 6786 opposite last page.

Heating tapes

Line of heating jackets and tapes for laboratory are described in eight-page catalog. Cat and Price List 58 — Burrell Corp., 2223 Fifth Ave., Pittsburgh 19, Pa.

Check 6787 opposite last page.

Alarm, control system

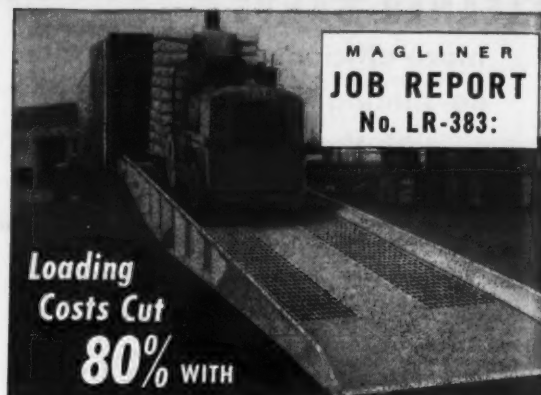
All-electronic solid-state device for gathering alarm and control data from remote stations is described in four-page bulletin. Monitron I & II Bul — Moore Associates, 2800 Spring St., Redwood City, California.

Check 6788 opposite last page.

Induction motor bulletin

Graphs and illustrations in eight-page bulletin demonstrate design principles that enable motor to accelerate as an induction motor and run at exact synchronous speed without permanent magnets or DC excitation. Bul 1900 — The Louis Allis Co., 427 E. Stewart St., Milwaukee 1, Wis.

Check 6789 opposite last page.



MAGLINER MOBILE LOADING RAMP

"Before installing our Magliner Mobile Loading Ramp," reports Mr. Leonard Wood, Plant Manager, Witco Chemical Co., "It took 16 to 18 manhours to unload a railcar from ground-level, and four manhours to unload a truck. Three men were required to handle each job. Now, one man and power truck handle a truck shipment in fifteen minutes... a railcar shipment in four hours. We figure our Magliner Loading Ramp paid for itself in six months, besides giving us extra safety for men, loads and equipment, and reducing our lift truck maintenance."

ASK ABOUT THE MAGLINER PROOF POSITIVE PLAN—See a Magliner mobile loading ramp at work, cutting costs right in your own operation.

Now Available! NEW NON-SLIP GRATING SURFACES FOR SAFE, SURE TRACTION IN ANY WEATHER

Another Magliner Exclusive!



Write for Bulletin DB-211, Magliner Inc., P.O. Box 438, Pinconning, Mich.

Check 6790 opposite last page

TRY DARCOVA PUMCUPS

FOR

- Higher pump efficiency
- Lower pump maintenance

IT'S a fact that hundreds of reciprocating pump and cylinder users today are standardizing on Darcova Pumcups because they eliminate fluid slippage, costly down-time and maintenance!

It's easy to check these claims right in your own plant. Behind this exceptional Darcova Pumcup performance lies texture-engineering and cup design that conform precisely to pressure-temperature-fluid conditions.



Cross-section of the conventional and 45° bevel type Pumcups

Pumcups of various types are available in a complete range of sizes and texture-engineered compositions for your reciprocating pump and cylinder requirements.

Why not get *all* the facts? Send today for Pumcup Bulletin No. 5503.

DARLING VALVE & MANUFACTURING CO.
Williamsport 4, Pa.



TRADE MARK

Pumcups

Check 6791 opposite last page

CHEMICAL PROCESSING

NOW! Stearns Drum Separators with amazing Indox V Magnets



Up to 40%
stronger than
ordinary permanent
magnet separators

Again Stearns gives you greater tramp iron removal at lower cost with revolutionary Indox V ceramic magnets. This time it's the new Stearns Drum Separators.

Revolving stainless steel drum carries material over stationary Indox V magnet assembly. Troublesome tramp iron is pulled out and discharged into a separate chute. Ideal for granular materials conveyed through closed chute or spout. Complete range of sizes.

Ask for FREE bulletin No. 1051-P.



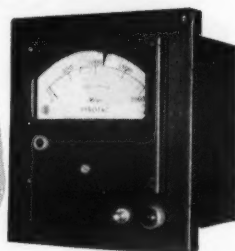
STEARNS MAGNETIC PRODUCTS

A DIVISION OF THE INDIANA STEEL PRODUCTS COMPANY
635 South 28th Street • Milwaukee 1, Wisconsin

Check 6792 opposite last page

HEATING PROCESS? PROTECT MATERIAL and EQUIPMENT

Automatically
with **Alnor** PYROTAC



Not expensive...but a simple, automatic way to safeguard your investment in heating equipment and materials in process.

The precision-built Pyrotac constantly indicates temperature of the heated equipment and sounds an alarm and/or shuts down the equipment at a safe, preset temperature. May also be used as a controller on processes where shutdown is required upon reaching final process temperature—such as ceramic kilns, molds, etc. Automatic thermocouple break protection assures complete safety if couple or lead wire should break.

Write for Pyrotac bulletin. Attach this ad to your letterhead, send to: Alnor, Room 504, 420 No. LaSalle St., Chicago 10, Ill.



PRECISION INSTRUMENTS
FOR EVERY INDUSTRY

Check 6793 opposite last page

NEW LITERATURE

Power transmission data

Calculated to plan the proper transmission for any drive, manufacturer's 186-page handbook contains valuable engineering charts, tables, and formulas to help the designer select the right gears and speed reducers for the job. Cat 57 — The Ohio Gear Company, 1333 East 179 St., Cleveland, Ohio.

Check 6794 opposite last page.

Dial thermometers

Dial thermometers with stainless steel stems that can be immersed in liquids or gases are described in Thermometer Bul — Arthur S. LaPine & Co., 6001 S. Knox Ave., Chicago 29, Ill.

Check 6795 opposite last page.

Glass fabricating

Fabrication, materials, tolerances, and applications of precision glass products are discussed in eight-page illustrated Cat 80-23 — Fischer & Porter Co., 691 Jacksonville Rd., Hatboro, Pa.

Check 6796 opposite last page.

Lists scale advantages

Manufacturer's bulletin describes continuous weighing scale's simple operation and lists its advantages. Available accessories and complete dimensional drawings are included. Bul 36-P1 — Omega Machine Co., div. of B-I-F Industries, Inc., 345 Harris Ave., Providence 1, R. I.

Check 6797 opposite last page.

NEXT MONTH

Read how Dunlop Tire & Rubber halved banbury manpower needs by switch to semi-automatic weigh-feeding of rubber-compounding agents. Bonus: Assured weighing accuracy for these crucial materials.

Announcing the New Jerguson MAGNETIC GAGE For Liquid Levels



An important advancement in liquid level observation for plants with dangerous explosive or inflammable conditions.

- Safety design seals against escaping gases.
- Measuring mechanism in stainless steel chamber.
- Scale mounted outside chamber; magnetically actuated through chamber wall.
- Distinct, accurate level shown in red contrasted with silver above.
- Job designed, correlating pressure, temperature, and specific gravity.
- For pressures up to 2500 lbs. @ 600° F.
- Can also be used for interface.

Write for folder on
Jerguson Magnetic Gages.

Patent
Applied
For

Gages and Valves
for the Observation
of Liquids and Levels

JERGUSON

JERGUSON GAGE & VALVE COMPANY
100 Adams Street, Burlington, Mass.

Offices in Major Cities. In Canada: Peacock Bros. Ltd.

Check 6798 opposite last page

STANDS ALONE!

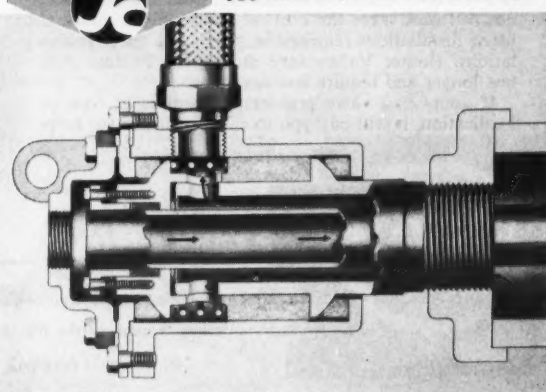
Type SN
Johnson
ROTARY
PRESSURE
Joint



THE JOHNSON CORPORATION
826 Wood St., Three Rivers, Michigan

There's not another rotary joint like the Johnson Type SN. Used where inlet or outlet pipe must rotate with the roll—on certain paper machines, drilled rolls of rubber or plastic mills and calenders, double shell dryers, and the like. Needs no external supports of any kind. Like all Johnson Joints the Type SN seals without packing, needs no lubrication or adjustment.

Investigate Johnson Joints for all steam-heated or water-cooled rolls. Handle Dowtherm, Monsanto Aroclors, hot oils too. Sizes to 8". For data on Type SN write for Bulletin N-2002.



Check 6799 opposite last page

Two-Way-Sealing Hamer Leakproof Gate Valves

**ASSURE POSITIVE SHUT-OFF
UPSTREAM AND DOWNSTREAM!**

Tiller-type handwheels afford plenty of leverage and make it easy to open or close valves.

Machined shoulder on stem seats against back seat bushing in the bonnet. Permits re-packing of valve while valve is open.

Close-fitting wedge guides are carefully machined, minimizing chatter or wear caused by the line pulsation.

Teflon® seals, well-known for their insert qualities, squeeze tight against wedge and with metal-to-metal fit, provide doubly effective line seal.

Hardened, precision ground wedge seating surfaces mean positive fit against seat.

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58-2A

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Test Tube to Tankcar

From page 48

cated, these can be carried on subsequently to the presentation. Initially, however, the supplier has an opportunity to present his story to technical representatives of all interested departments.

MERRILL: Dr. Libby, who makes the decision of circulating new product reports? Is there any screening?

LIBBY: Very little. We believe every new chemical is likely to be of interest to some research people. Of course we have to be a little critical, but there is very little screening-out.

DOLIAN: Isn't any worry on this score eliminated by the caliber and experience of the men in the department?

LIBBY: That's a good point. The men primarily responsible for this activity have many years of service with the company, with much experience in research, and they keep in very close touch with the research interests and objectives of all our departments.

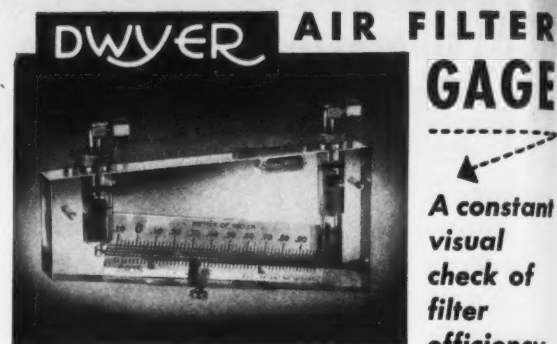
MERRILL: We have a similar setup. In our Tire Division, the purchasing and development departments work very closely. Initially, if it's a new chemical the technical people are contacted, with purchasing department informed through a carbon copy.

SCHULTE: We have done it both ways. We maintain contacts with the research departments of some of the main chemical companies who are interested in our industry. Our purchasing department also maintains contact with their sales representatives.

Contacting the Customer

LIBBY: From the supplier standpoint, perhaps we should consider the kind of representative the customer prefers to see?

DOAN: We have an arrangement that may be interesting. We have a procedure of channeling all new chemicals through one man who contacts only certain customers. He will be continually in contact, for example, with Du Pont, supplying long lists of chemicals and learning what



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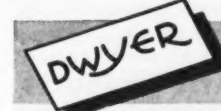


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CHEMICAL PROCESSING

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THRODAHL: We have a similar procedure. Our development department has a section for exploratory and intermediate chemicals. Members contact all potentially-sizeable users. We even formalize a group presentation, calling it a "dog and pony show."

Our experience in the past three years is that we obtained some useful results with presentations. The approach cannot be used too often because the number of compounds available does not change that much. But perhaps once a year we have enough new material.

DOLIAN: Who makes up this team?

THRODAHL: They are the best organic chemical minds we have.

DOLIAN: We've done the same thing. We even use people from our research organization.

DOAN: Do not the examples we have brought up all concern intermediates and not end-use chemicals?

THRODAHL: Correct. Obviously we will have more information about an end-use product. We will be able to pin-point our targets much better.

Sampling

DOLIAN: Once the contact has been made, how should sampling be handled?

Should the sample be sent



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In the picture, note that the car is being unloaded through pipes under the pavement. During operation these are under less than atmospheric pressure, so there can be no loss of liquid. The packingless Type G's can't leak, either, and their only maintenance requirement is routine lubrication.

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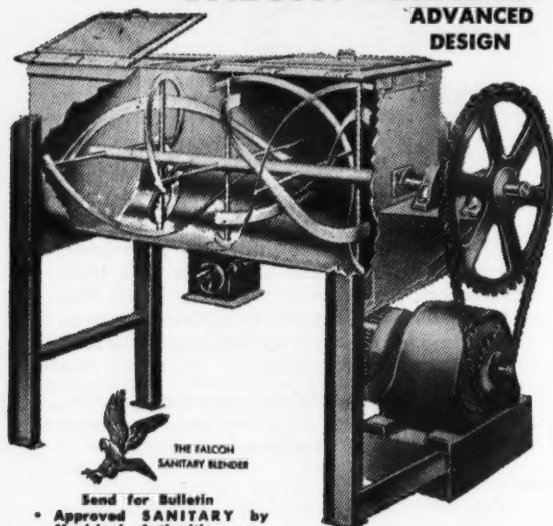
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Test Tube to Tankcar

From preceding page

out at laboratory stage, pilot plant, or semi-commercial stages?

MERRILL: I mentioned we would like to get into the initial development stage, but we prefer sufficient quantities. In other words we would sooner examine a truckload of material than 10 pounds because of quality variations.

DOLIAN: How should a small quantity, as 40 pounds, be distributed?

MORGAN: Sometimes 40 pounds of material, if a pharmaceutical intermediate, is quite a bit. I believe customers are very reasonable the first time around. Particularly, if they can be assured in a few days or months more material will be available. The manufacturer should provide pilot-plant quantities promptly.

DOLIAN: One most important factor is to acquaint your possible customers with availability of the material.

Samples and Supply

BATEMAN: The ability to supply is more important than the amount available at any one time.

If the supply picture is not clearly developed, then is it not better to wait until more than the first pound, ten pounds, or 20 pounds are available?

DOLIAN: That is probably ideal, but what about research chemicals that may not be available in large quantities for some time?

BATEMAN: A plan must be made for supplying the amount that is needed. This is more important than the quantities available at any one time.

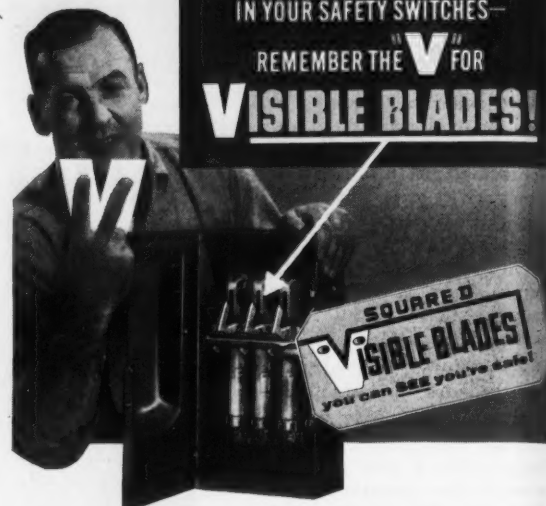
MERRILL: Start with the samples. These can be evaluated in the laboratory. Eventually the material must be tested in the factory. The next stage is production. When the material is in limited production, sufficient amounts should be available to plan the marketing.

BATEMAN: Each product and each potential customer... and each plan... must be different. Using Du Pont as an

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CHEMICAL PROCESSING

example, a plan would require giving them a sample in the very early stages. Full development would not be completed and it would involve further research work in Du Pont's laboratories.

If a manufacturer knows an end-use, but application research is needed, a more fully-developed plan on the availability of materials should be made.

One factor which slows down the process from test-tube to tankcar is to go to market without a plan for supplying the material.

The manufacturer may prematurely approach the one possible user and a follow-up cannot be made. Yet his best prospect for moving ahead with the product may have been crossed off the list.

THRODAHL: Isn't it important that both supplier and user clearly state what their interest is in the material? But this is often very difficult when a user first sees the material. He really doesn't know.

DOLIAN: Do any of you know of cases where something has fallen down the crack because large quantities were not available at the appropriate time?

SCHULTE: I have heard of one or two, but that is a risk that must be taken. I believe the earlier research material is made available, the shorter the time from test-tube to tankcar.

Is There a Market?

I am wondering how it can be determined the material will eventually be marketable.

BATEMAN: Other people must have a chance to look at it. The manufacturer may have ideas, but users must look at the material to confirm the manufacturer's appraisal.

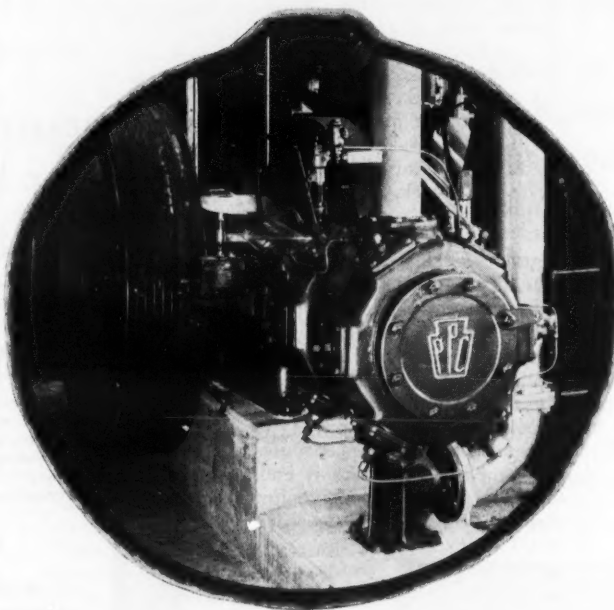
SCHULTE: That's right. Time can be wasted planning production, and so on, if it is found eventually there is no market. The customer generally can indicate the market possibilities of the new raw material.

BATEMAN: It's even possible



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Test Tube to Tankcar

From preceding page

to talk in generalities with a prospective user without submitting the sample, isn't it? **SCHULTE:** Yes. But actually it's almost necessary to send a sample even though it need not be a very large one.

DOLIAN: It boils down to this. The manufacturer needs the customer's advice.

BATEMAN: In other cases, research may lead not only to one product but to a number. Then a more complicated picture arises. Ten different industries can be involved. The manufacturer has to talk to many more than one, and look at the broad overall scope.

In some cases an incentive will exist to delay sending new materials to a customer, to develop all the use patents possible. A customer may secure a use patent on a material and then develop market control or an exclusive position.

DOLIAN: This is a real problem in a complicated development with a great number of products involved and many industries. A calculated risk must be taken in planning and developing manufacturing facilities to make quantities available for large scale experimental work.

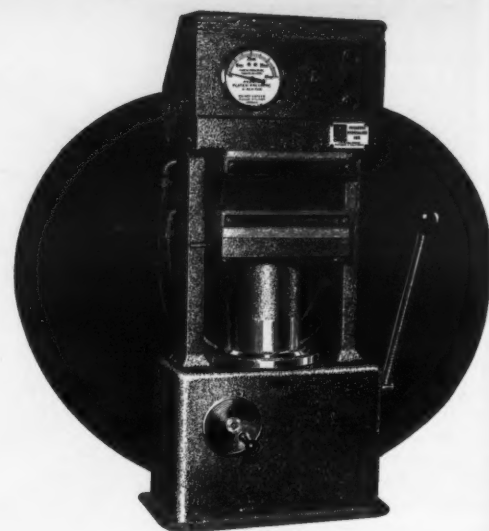
Pricing

DOLIAN: How should these new products be priced?

The crux appears to be what price should be put on a product during development. Should it be priced low, approximately the expected commercial price to encourage people to evaluate it and to make it less expensive for them to carry on large-scale tests?

MORGAN: We want each product to stand on its own feet. We are willing to carry a product to a certain extent, but we think that if it has merit the user companies should have enough confidence to go along with us.

However, at the same time a relatively high price is charged for material in the development stage, some encouragement should be given that the price will be reduced as soon as reasonably possible.



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AUGUST 1958

AFFLECK: Our policy during development of a new product is to adopt a price that will allow breaking even on current manufacturing costs.

There are many exceptions to this. For instance, if the new product competes directly with materials already existing, the price should be very close to the ultimate commercial price. Otherwise no one will bother to look at the material.

Pricing involves questions of business judgment. These must be handled separately and individually for each product developed. The questions always asked are "How much money should be invested in this particular project?" and "Is too much being invested?" "Should slightly more be put into the product to bring the price down and get it going faster?"

SCHULTE: Ultimate pricing should be realistic and commensurate with value of end product. Pricing very often influences the volume consumed of the new raw material.

DOLIAN: But what happens if a manufacturer is not shooting for a definite market?

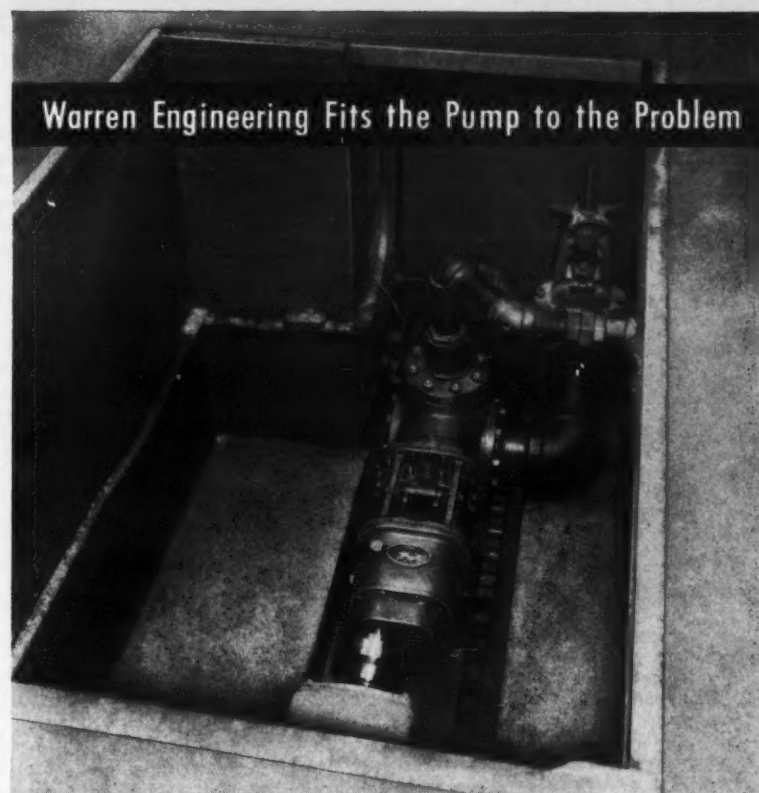
MORGAN: I have said that we like products to stand on their own feet as far as pricing is concerned. However, if we have confidence in a product we will subsidize it.

One isocyanate we make is currently being sold for approximately half of its cost. We think an eventual price will be less than half of the development price.

In setting a price, the company must have faith. The company must know its own economics as well as the economics of its customer's problems. Only on such a basis can a company take a calculated risk on a product.

DOAN: Why wasn't the isocyanate price originally placed at something close to the final market price, even if the company would be losing more money in the development stage?

MORGAN: This is a question of timing. Sometimes it is better to reduce a price periodically.



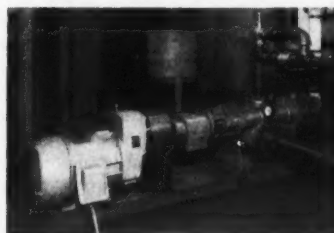
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Here is another Warren #3 1/2 External Gear and Bearing Screw Pump recently installed in the same plant.

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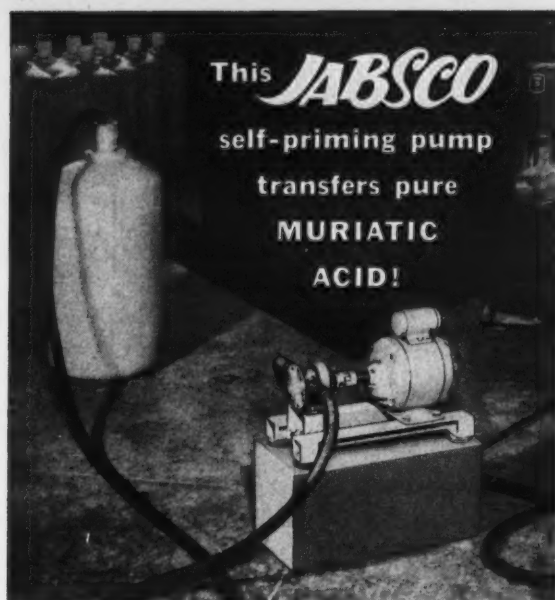


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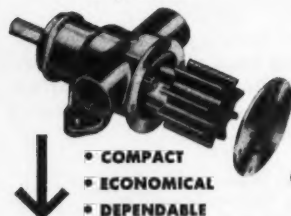
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"We might also point out that we have never had an accident since using your pumps and actually we rarely use face masks or breathers when transferring the acid from the carboys to the machines." Jabsco pumps are widely used for this service, even though they are not specifically recommended for it, due to the exceptional corrosiveness of the media. In many cases, the low initial and low repair costs more than offset shortened service life. Of course Mr. Harriman took exceptional care of his pumping equipment but he found a low cost answer to his problem.



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Test Tube to Tankcar
From preceding page

cally because of the increased interest created. Also, the degree of subsidization must be justified to management and documented. Sometimes we cannot justify a lower price at the moment.

AFFLECK: Pricing is not a one-sided affair. The customer, if he knows a manufacturer's process and raw material position, can frequently determine for himself what a fair price should be at various levels of production volume.

BATEMAN: In pricing of chemicals, cannot all chemicals be divided into two categories? One is a new product for a new application. Another new product is a direct replacement for a material on the market; this must be priced competitively with the older product.

If a new product is being developed for a new field, then both manufacturer and customer are in the development together and both gain. In this case, it's a question of how to share the development expense and should be priced accordingly.

A rival technique of developing a market for material is to offer the product widely. In trying to broaden the market right at the beginning, the manufacturer must be realistic with his price, closer to the eventual commercial price. **SCHULTE:** Again we are talking about different circumstances?

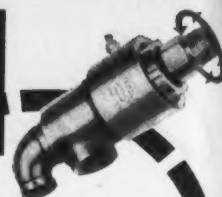
BATEMAN: Correct.

SCHULTE: In the one case, most of the development cost is spread between manufacturer and customer. In the other, most of the development cost is absorbed by the manufacturer and a minimum on the user. The first arrangement is more or less limited to a semi- or exclusive arrangement because of sizable development expenditures on both sides.

LIBBY: As a customer, Du Pont will not quibble about price at the development stage.

However, we are particularly concerned about receiving long-range pricing information. The sooner we can

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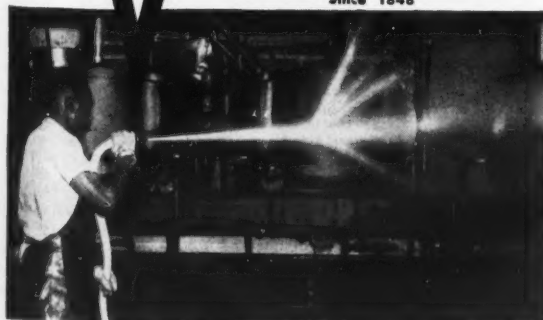
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receive that information the better.

Users are often expected to share the manufacturer's development costs and we think the supplier, if the occasion demands, ought to be willing to share the user's development costs.

The development price must therefore be a compromise and decided on an individual basis.

Introductory Prices

BATEMAN: I think a reappraisal is necessary at several stages in the development.

First, we are talking about development costs and not about recovering the research expenditures of the manufacturer.

In the first stage, there may be some agreement on price. In the second stage, the user will be placing a larger number of dollars into the testing area. Again, a reappraisal must be made on both sides. As quantities become larger, there should be further reappraisals of price.

An introductory price is only valid until data can be secured and the second step becomes possible.

LIBBY: But the main question is where this price curve will level off.

BATEMAN: Yes. In the meantime the user must know what the eventual price on the material will be.

DOLIAN: Has anyone encountered any psychological barriers to an initially high price which covered only out-of-pocket costs?

AFFLECK: Yes. Innumerable instances. The answer is "Come back to us when you have what you think will be the ultimate price. We will then take a look at it."

DOAN: Isn't most of this misunderstanding really due to a lack of appreciation on the part of the customer because he is outside the chemical business?

AFFLECK: This is certainly true. And yet we have found many people outside the chemical industry willing to try a product at a high intro-

To page 194

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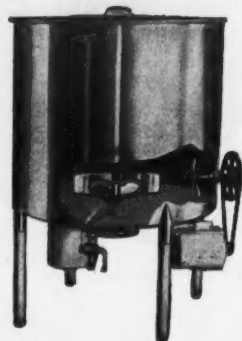
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Test Tube to Tankcar

From page 191

ductory price in hope that they might find it useful and ultimately economical.

MORGAN: Isn't this an area of salesmanship? The man is not only selling a product but himself and the company, too. The salesman is selling the idea that he is out to do the best job he can for his customer, but he's not going to hurt himself, his company, or his customer while doing it.

Follow-up

DOLIAN: How soon should the manufacturer follow-up delivery of samples?

AFFLECK: This depends on whether it is an intermediate or a product tailored to do a specific job. In the case of the rubber accelerator, we know from experience the approximate time it takes the customer to make a preliminary evaluation. We can then follow-up immediately.

An intermediate, where a shotgun broad-side or a "dog and pony show" is required to interest research people, would require a longer evaluation time. If the follow-up is too soon, prospects will be annoyed. Six months might be a normal follow-up in such cases.

BATEMAN: If the progress from test-tube to tankcar is to be speeded — follow-up must be aggressive.

DOAN: With a large number of products developed for end-use category, follow-up must be early and frequent to provide technical assistance.

BATEMAN: Does the customer who receives a sample welcome a technical assistance follow-up?

DOLIAN: Yes. Frequently after a prospect has new product samples for three or four months a number of questions may arise. Then he will welcome a visit by the supplier.

LIBBY: We often canvass our laboratories as to the status of a sample — what problems have come up, what is the evaluation, is direct contact with the supplier needed? Thus a consolidated company appraisal is reported to the supplier.



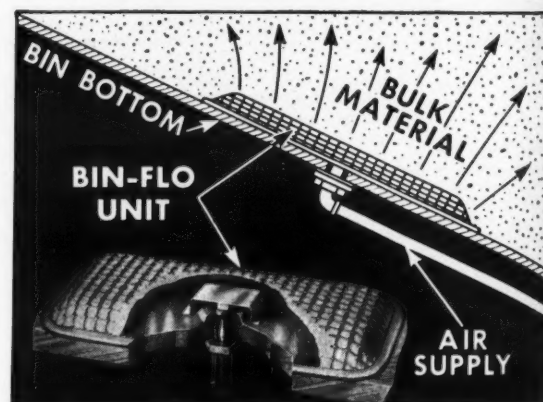
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Please type or print and be sure to give your title and main product of company

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AUGUST 1958

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that's interesting

... Thought-provoking slants
on projects and products

Safety in subs

Atmosphere monitoring will insure safety and health of atomic powered submariners. Instrument supplied by Beckman Process Instruments Division will sample air from 12 various locations within the sub and continuously detect concentration of such gases as carbon dioxide, carbon monoxide, oxygen, hydrogen, and freon. Presence of abnormal or insufficient quantities of these gases will determine when it is necessary to surface for air.

How much energy?

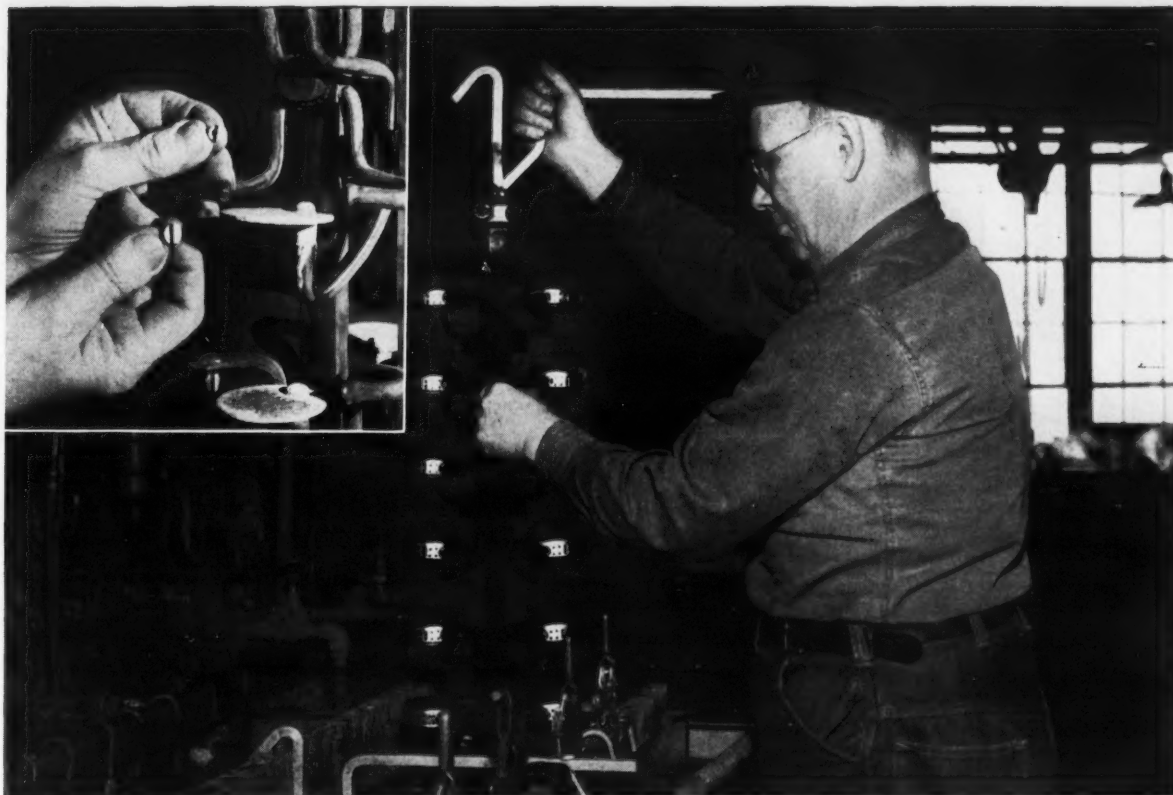
Work at the Oak Ridge National Laboratories has turned up some interesting facts on energy requirements. These estimates may help settle the family arguments about who works the hardest. We hope they don't start any!

Activity	Energy cost Cal/min.
Walking	3.6
Shoveling	8.4
Dancing — Fox trot	5.0
Golf	5.0
Mopping	4.2
Typing	1.8
Sleep	1.0

Although the brain uses about 20% of the total oxygen required by the body when at rest, it uses little more during concentrated mental activity.

Electricity from heat

Two MIT professors have developed a "thermo-electron" engine which converts energy of heat directly to electricity, by-passing steam cycle. Two metal plates, in a vacuum, separated by 1/1000" are utilized. Hot plate (2200°F) boils electrons to cold plate (1000°F). A model has produced electric power at an efficiency of 12%, and the inventors believe that an efficiency of 30% may be reached. (The Wheeler Eco, C. H. Wheeler Mfg. Co.)



Electropolishing racks covered with HYPALON are in good condition after six months. If product changes make racks obsolete, new adapters can be mounted on existing splines.

IN ELECTROLYTIC POLISHING

HYPALON® Outlasts Other Materials 8 to 1

HYPALON's resistance to strong oxidizing chemicals can save you time and maintenance dollars. Every year the metal finishing industry spends millions of dollars maintaining plating and electropolishing racks. The reason: the protective coating on ordinary insulated racks often deteriorates in a short time.

In Cleveland, the Guarantee Specialty Manufacturing Company has been using a new type of electropolish-

ing rack protected with a vulcanized cover of DuPont HYPALON. Despite six months of exposure to phosphoric acid, no failure has been discovered. Three weeks was a good life for the ordinary coating on the old racks, yet recent examinations indicate that HYPALON will continue to give favorable performance.

Similar racks are in electroplating service at automobile plants. Reduced downtime is saving money, but there

are other advantages for electroplaters. The tight bond between the rack and the vulcanized HYPALON cover eliminates pockets, and the smooth surface permits rapid run-off, reducing drag-out losses and the risk of contaminating solutions.

HYPALON offers more than resistance to chemicals. It's ozone-proof, and it performs well in temperatures up to 350° F. For more information on its properties and uses, mail coupon below.

ELASTOMERS IN ACTION

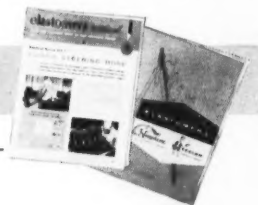
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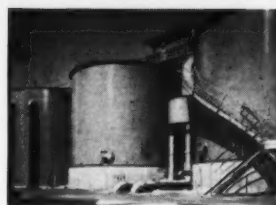
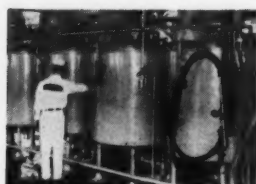
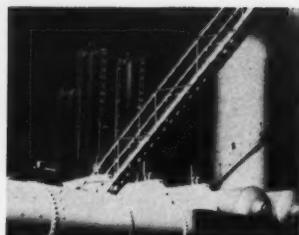
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- E. I. du Pont de Nemours & Co. (Inc.)
Elastomer Chemicals Dept. CP-8
Wilmington 98, Delaware

Name _____
Firm _____
Address _____
City _____ State _____



Check 6826 opposite last page



BEAUTY PLUS PROTECTION

There's a reason why milady has less trouble with sun-baked lips than men folk have. It's because her lipstick *protects* as well as *beautifies*. Industrial installations too, can have Beauty as well as Protection with AMERCOAT 35, the *only* coating that combines the corrosion resistance of vinyl with the permanent gloss and color retention of acrylic resins, in a complete range of industrial colors. Here is the proven performance of AMERCOAT 35

■ **Test No. 1** In Florida, various coatings were exposed for two years to severe weathering, high temperature, humidity and salt spray. Only AMERCOAT 35 showed "outstanding color and gloss retention—no chalking."

■ **Test No. 2** In Texas, a number of coatings were subjected for a year to hydrochloric acid fumes, salt and caustic spray, and extreme humidity. AMERCOAT 35 showed "no blistering, peeling or flaking. General appearance excellent!"

■ **Test No. 3** In the Gulf Area, competitive coatings were subjected to an atmosphere laden with moisture, magnesium chloride and sodium hydroxide. AMERCOAT 35 showed "the highest order of gloss and color retention."

AMERCOAT 35's glossy surface resists pickup of dust and dirt—reduces maintenance costs.

It withstands alkalis and most dilute mineral and organic acids, and is unaffected by all

concentrations of salt solutions at normal temperature. Specify

AMERCOAT 35 protective coating for chemical and petroleum plants, tank farms, ship hulls, machinery, food and beverage processing equipment—wherever *protection* against corrosion is mandatory, and *beauty* is an important added advantage. ■ For complete information write today, giving the proposed application and environment.



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